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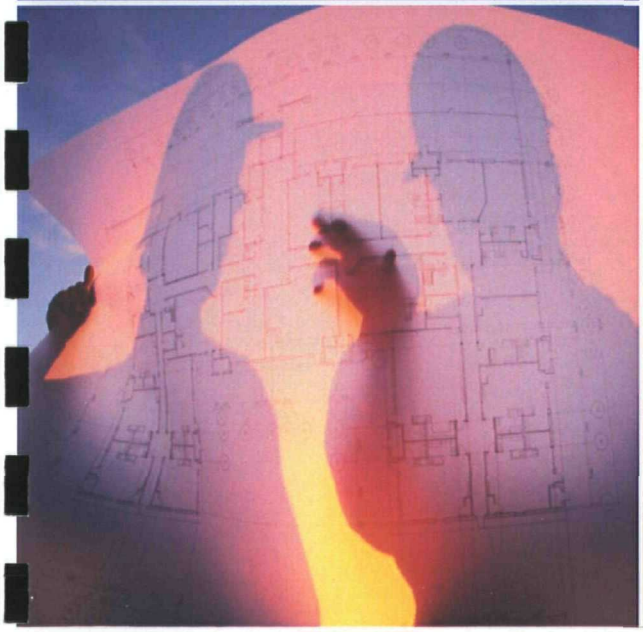
Statement of Qualifications - Remedial Design/Remedial Action

Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site
Willow Boulevard/A-Site Landfill Operable Unit

May 2009



Qualifications and Experience

ARCADIS is a global network of business professionals that provides project management, consultancy and engineering services to enhance mobility, sustainability and quality of life. With 13,500 employees and $2 billion in gross revenue, the company is multi-nationally present with a close-knit local network. In the U.S., the ARCADIS workforce consists of more than 4,000 employees in 150 offices that can be called upon to support remedial design/remedial action activities for response actions at the Willow Boulevard/A-Site Landfill Operable Unit of the Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site. When coupled with our resources in the Midwest (more than 300 scientists, engineers, geologists, and field staff in 10 offices), ARCADIS has the expertise and capability to address any project-related challenge.

ARCADIS has extensive experience developing and implementing remedial design activities for Superfund sites, including sites in USEPA Region 5, and providing a wide range of similar remediation and restoration services to dozens of Fortune 500 companies. At ARCADIS, we understand Superfund-related work is technically complex, so we employ a combination of proven investigative techniques and specialized engineering expertise to design and implement effective remedial programs and solutions.

Moreover, ARCADIS has more than 15 years of direct experience performing investigation, evaluation, and response actions at the Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site. Our specific involvement at the Willow Boulevard/A-Site Landfill Operable Unit (OU 2 of the Site) has included developing and implementing the Remedial Investigation, drafting the Remedial Investigation/Focused Feasibility Study report, and implementing interim remedial actions. ARCADIS was also involved in the development of the Consent Decree and Statement of Work that will guide the upcoming remedial design and remedial action at the Operable Unit.

Considering this extensive prior involvement, we have the Site-specific knowledge and project history to implement the remedial design and action. This project calls for excavating and consolidating materials impacted by polychlorinated biphenyls (PCBs), creating a setback to cut off the hydraulic connection between impacted materials and the Kalamazoo River, stabilizing banks and berms and establishing erosion controls across the Operable Unit, constructing a cap over the consolidated materials, and implementing long-term maintenance, monitoring, and institutional controls. The work also calls for habitat enhancement and construction efforts. The end result will be implementation of the project in a manner that addresses unique site conditions and improves the environment at the Operable Unit, contributing to recovery of the Kalamazoo River system. The remedial design and action at the Willow Boulevard/A-Site

Landfill Operable Unit is very similar to the remedy Blasland, Bouck & Lee, Inc. (BBL, now ARCADIS) successfully designed and implemented at the King Highway Landfill Operable Unit, which is also part of the Kalamazoo River Superfund Site. The U.S. Environmental Protection Agency completed its five-year review of the King Highway remedy as part of the Superfund Program, and that project is in the operation and maintenance phase.

Qualifications and Relevant Experience

Landfill Closure

ARCADIS has extensive experience in turnkey construction involving earthwork and landfill projects. Our earthwork experience ranges from limited "hot-spot" excavation and disposal to major earth-moving projects. Our landfill experience focuses on the closure of residual, industrial, municipal, and hazardous waste landfills.

ARCADIS' turnkey landfill projects include design and construction of clay caps, multi-layer geosynthetic caps, leachate collection systems, leachate treatment systems, containment walls, and gas control systems. The ARCADIS approach integrates engineering and construction functions to provide cost-effective and objective-driven earthwork and landfill projects. ARCADIS completes constructability reviews throughout the engineering process and provides engineering assistance throughout construction.

ARCADIS has the staff, support systems, and commitment to provide intelligent, effective, and economical solutions to our clients' landfill remediation projects. Our team includes project managers, supervisors, project engineers, operators, laborers, technicians, hydrogeologists, toxicologists, surveyors, air pollutant modelers, mechanical/electrical/structural engineers, ecologists, and industrial hygienists. Based on the specific needs of each project, ARCADIS can either complete the work in-house or use our network of qualified subcontractors to complete the work. ARCADIS recognizes that there is no one solution that works for all projects; therefore, we develop a site-specific strategy for each project that meets the individual needs of each client. ARCADIS' constant focus on our clients' results in successful projects completed safely, cost-effectively, and on-time.

Soil Excavation

ARCADIS has recently completed contaminated soil excavation projects ranging in size from 1,000 to 200,000 cubic yards. ARCADIS completed these projects from initial planning through final disposition of excavated materials, including all construction components and management of transportation and disposal. We use our construction and engineering experience, regulatory knowledge, and understanding of our clients' requirements to achieve the successful completion of each project.

ARCADIS has designed, managed and implemented hundreds of excavation/transportation & disposal (T&D) projects. While the scope and complexity varies by project, one thing remains constant for an effective resolution to an excavation/T&D project...effective schedule and cost management and conducting the project in a manner that causes the least disruption to the surrounding community as possible.

Restoration Services

ARCADIS' integrated, interdisciplinary approach to ecological enhancement and restoration services combines ecological and engineering expertise. Our professional team includes nationally recognized experts with broad-based experience in all aspects of restoration work in various ecological settings, including upland transition areas; wetlands; streams, ponds, and lakes; rivers; and estuarine/coastal systems. We offer our clients practical and economical solutions to their ecological enhancement and restoration needs.

Ecological restoration services offered by ARCADIS include wetland restoration and mitigation; stream, river, and lake restoration; constructed treatment wetlands; and phytoremediation. Our capabilities include site and habitat suitability analyses, hydrologic evaluations, hydric soil investigations, conceptual and engineering designs, restoration/ mitigation plans and specifications, wetland banking evaluations, ecological benchmarking, construction observation/implementations, and post-construction monitoring and Adaptive Management.

ARCADIS also provides "front-end" ecological evaluation services such as wetland delineation and permitting, ecological assessments, habitat analyses, threatened and endangered species surveys, environmental impact assessments, ecological risk assessments, and natural resource damage assessments (NRDAs).

ARCADIS' approach to ecological restoration starts with reasonable project objectives within the context of our clients' overall needs and goals. Next, a restoration design builds on project objectives (e.g., site restoration, habitat enhancement, ecosystem damage offsets, water treatment), with a focus on achieving the objectives within the framework of site constraints and/or limitations. We recognize that our actions at a given site need to promote conditions that allow nature to take its course to create a viable ecosystem, and to fulfill the project objectives. ARCADIS has success in ecological restoration because we establish conditions conducive to the end result – the desired ecological system remains our primary focus.

Relevant Experience

The following list of representative projects highlights a small sampling of our experience performing soil excavation/restoration projects. More detailed experience can be provided upon request.

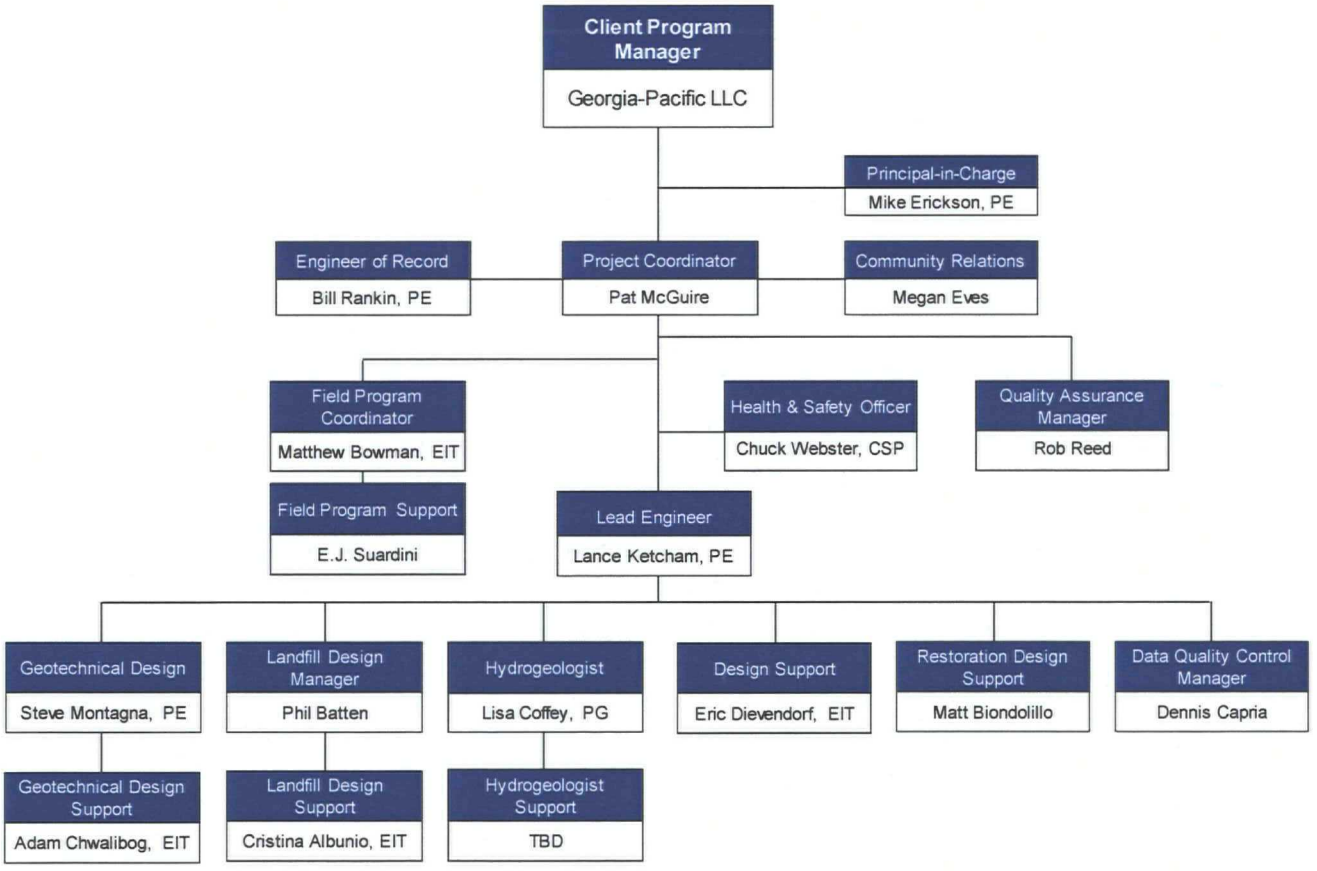
Location	COCs	ARCADIS Services
Region 5		
Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site – Kalamazoo and Allegan Counties, MI	PCBs	• Multiple projects involving excavation/consolidation of PCB-impacted soils and sediments from former lagoons, former disposal areas, former mill properties, floodplains, and targeted soil/sediment deposits • Stabilization of berms, installation of sheetpile walls • Installation of landfill/waste area capping systems • Site restoration – including "soft" engineering techniques for river banks, revegetation with native plants, habitat enhancement • Installation and operation of groundwater recovery and treatment system • Installation and operation of landfill gas recovery system
Cytec Industries – Marietta, OH	Pesticides & heavy metals	• Excavation and offsite disposal of impacted soils and sludges • *In situ* stabilization of approximately 28,000 tons of lead-impacted soils. • Site restoration
Confidential Client, Shopping Center Redevelopment - OH	VOCs, PCE	• Source area soil excavation • Site redevelopment
Wisconsin Gas Company, Former MGP Site – Milwaukee, WI	PAHs, BTEX	• Excavation, treatment, and backfilling of over 75,000 tons of soil, concrete, bricks, and debris
BASF Corp., Historical Manufacturing Site – Holland, MI	Petroleum hydrocarbons, PAHs, Coal tar, Ferric ferrocyanide	• Excavation of soils impacted above MDEQ Industrial Direct Contact criteria • Site restoration
Confidential Chemical Client, Former Bulk Chemical Terminal – Roseville, MN	Various	• Excavation of shallow contaminated soil from two areas of concern • Site restoration
Springtime Liquidating Trust, Former Industrial Facility – Milwaukee, WI	TCE, Other chlorinated hydrocarbons	• 3,600 tons of impacted soil removed from seven targeted areas • Site restoration

Location	COCs	ARCADIS Services
Confidential Rail Yard – West Central WI	TCE, VOCs, PAHs, Lead, Arsenic	• Limited soil excavation removing an estimated 90 percent of contaminant mass from vadose zone soils • Site restoration
General Capital, Washington Square Mall Redevelopment Project – Germantown, WI	PCE	• Excavation/ off-site disposal of RCRA F-Listed soils • Site redevelopment
Rest of U.S.		
Confidential Client, Residential Soil Remediation – Rome, GA	Arsenic and lead	• Removal of approximately 75,000 tons of contaminated soil • Initial removal action on an expedited basis for almost 3,000 tons of soil located beneath three playgrounds at the site • Restoration, including backfill, sod placement, bush and tree planting, and replacement of residential items (e.g., mail boxes, clotheslines)
Confidential Client, Deep Soil Excavation – Hicksville, NY	PCBs and VOCs	• Excavation, transportation and disposal of ~ 670 cubic yards of contaminated soil • Removal of approximately 3,500 cubic yards of concrete, the onsite crushing of the removed concrete, and onsite placement of the crushed concrete • Site restoration to support sale of property
Confidential Client, VOC-Impacted Soil Excavation, Olean, NY	VOCs	• Removal, transportation and disposal of approximately 5,055 tons of VOC-impacted soil • Site restoration
Bern Metals Corporation - Clinton-Bender Superfund Site, Buffalo, NY	Lead	• Construction management for the excavation, transportation and disposal of ~4,500 tons of impacted soil • Site restoration
Confidential Client - Design/Build Services as Part of an Interim Corrective Measures Plan, Brockport, NY	VOCs	• Removal and off-site disposal as hazardous waste of 732 tons of soil • Removal and off-site disposal as nonhazardous waste of 168 tons of soil • On-site consolidation of approximately 400 tons of soil as backfill
Confidential Client - Excavation and Thermal Treatment of Soil, Hollywood, MD	PAH	• Excavation and thermal treatment of more than 200,000 tons of PAH-contaminated soil at a former wood-treating facility
Confidential Client – Soil Excavation at Former Manufacturing Facility, Maryland	VOCs	• 275 tons of soil excavated and transported to a Subtitle D landfill • Site restoration to support sale of property

Location	COCs	ARCADIS Services
Public Service of North Carolina – Remedial Activities at Former MGP Site, Raleigh, NC	Arsenic and Lead	• Excavation, transportation and disposal of ~10,000 tons of soil • Site restoration
Confidential Client – Remedial Activities at a Former Manufacturing Facility, Georgia	PCBs	• Excavation, transportation and disposal of 14,000 tons of TSCA and non-TSCA soils • Site restoration
Rockwell Automation, Inc. – Soil/Sediment Remediation at a Former Manufacturing Facility, Russellville, KY	PCBs, chromium, cyanide	• Excavation, transportation and disposal of 239,000 cubic yards of impacted soil/sediment • Site restoration, including wetlands/stream
Westinghouse/CBS – Remedial Services, Springfield, MA	PCBs	• Excavation of 37,000 tons of impacted soil • Site restoration
Arizona Public Service – Remediation of Former MGP Site, Phoenix, AZ	MGP-related impacts	• Excavation of 6,685 tons special waste soils and 479 tons hazardous waste soils • Site restoration
Kennecott Utah Copper Corporation – Remedial Activities at Mine Site, Utah	Lead and arsenic	• Excavation of >1.5M cubic yards of tailings material excavated and placed in an on-site repository • Site restoration
Confidential Client – Oil Field Remediation, Coalinga, CA	Oil field waste and petroleum	• Excavation of 30,000 cubic yards of soils/sludge • Seeding/restoration of 50 acres

Project Team

ARCADIS has assembled a core team of engineers and task managers for this project with an emphasis on both technical and managerial experience. Our team offers experience at CERCLA sites and consists of individuals who have provided engineering design, environmental reporting, and construction management services at various sites. This team will be organized as shown in the following organizational chart. Detailed resumes for each project team member are provided in Appendix A.



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Appendix A

Team Member Resumes

ARCADIS

Education
MSE, Civil Engineering, Michigan Technological University, 1996
BSE, Environmental Engineering, Michigan Technological University, 1995

Years of Experience
Total - 14
With ARCADIS - 8

Professional Registrations
Professional Engineer, MI

Professional Associations
American Chemical Society
International Association for Great Lakes Research
American Society of Civil Engineers

Michael J. Erickson, PE

Associate Vice President / Principal Engineer

Mr. Erickson has more than 14 years of experience in science and engineering of management of contaminated waterways and waterfront areas. He has specialized experience in aquatic systems investigation, analysis and sediment management. His expertise includes site characterization, monitoring and mathematical modeling of chemical fate and transport, environmental data analysis, integration of risk assessment and alternatives development, and engineering and design of remediation projects. He has specialized expertise in fate and transport modeling for risk-based remedial alternative evaluation at contaminated sediment sites. He has served as engineer of record for several sediment remedial design projects and has led studies and development of closure plans for shoreline waste disposal areas. In these capacities, Mr. Erickson has lead programs related to site investigation, remedial decision making, remedial design, and environmental permitting at some of the highest-profile sites in the country. Mr. Erickson is experienced in working with diverse stakeholders including; private, state, and federal entities, as well as the public.

Project Experience

Riverfront Waste Disposal Area Closure Plan and Dredging Design
Confidential Client, Wyandotte Michigan
Project Manager and Engineer of Record for development of a closure plan for a 27-acre riverfront waste disposal area that included sediment investigation and design of a dredging project at a Site on the Detroit River in Michigan. This project targeted up to 30,000 cubic yards of sediment. Sediment investigation activities included; sediment probing and coring, hydrographic survey, and mapping of sediment deposits. ARCADIS designed the dredging project which involved barge- and shore-based removal, a temporary sheet pile flow diversion wall, silt curtain enclosures, turbidity monitoring, and consolidation of sediments with upland materials in a containment cell at the site. Negotiated project basis for Consent Order with MDEQ, negotiated permit requirements with the MDEQ and USACE. Supervised field studies, hydrodynamic modeling, and engineering analysis.

Sediment PCB Superfund Site RI/FS Project Coordinator
Confidential Client, Michigan
Overall project coordinator for RI/FS under Consent Order with USEPA to address PCB contamination in a large Midwest river site spanning 80 miles. Project complexities include former landfill and mill property potential source areas, historical and existing impoundments, floodplain interactions, and highly variable land use along the Site. Responsible for communications with

agencies and natural resource trustees, public meetings, and overall project direction and management.

Stream Sediment Removal and Restoration

Confidential Client, Michigan

Engineer of Record for stream sediment removal and restoration design project to remove 12,000 cy of stream bed materials impacted by adjacent landfill and to backfill and restore the stream bed with placement of native materials. Project involved by-pass pumping of stream flows, removal in-the-dry, on-site dewatering and stabilization and trucking for landfill disposal.

Sediment Remediation Priorities Determination for the Ottawa River

Toledo Metropolitan Area Council of Governments (TMACOG), Toledo, Ohio

Project Manager responsible for sediment investigation, identification and analysis of remediation alternatives, and recommendation of remediation priorities for the lower Ottawa River. Presented study findings to project stakeholders and provided technical support to TMACOG funding proposals for further development of remediation plans.

Sediment Investigation and Dredging Design

Confidential Client, Great Lakes Region

Engineer of Record responsible for characterization of the distribution and characteristics of cement kiln dust (CKD) impacted sediment in a stream channel, and design and permitting of an in-the-dry dredging and stream channel restoration project. Stream flows were bypassed around the project area by pumping. Approximately 12,000 cubic yards of impacted sediments were removed and the channel bottom and banks restored by backfilling and armoring.

Evaluation of Sediment Remediation Alternatives for the Kalamazoo River

Kalamazoo River Study Group, Kalamazoo, Michigan

As a Project Technical Manager, directed a multi-disciplined project team that conducted surface water sampling, sediment erodability testing, and other field measurements and model development to produce an integrated suite of PCB fate and transport modeling tools for evaluation of sediment management alternatives for the Kalamazoo River. Long-term PCB trends in sediment, water, and fish were compared to available data and detailed modeling of remedial alternatives supported evaluation of remediation alternatives.

PCB Fate and Transport Model Development

Confidential Client, Northeastern United States

Project Engineer and Task Manager responsible for development of a PCB fate and transport model for a major river system impacted by PCB. Conducted statistical analysis of nature and extent of PCB distributions in sediment and sediment characteristics, developed, calibrated, and applied a long-term PCB fate and transport model. Served as a liaison between Ecological and

Human Health Risk assessment teams. Simulated long-term PCB exposure for risk-based evaluation of sediment remediation alternatives.

PCB Fate and Transport Assessment

Confidential Chemical Manufacturer, Great Lakes Region

Project Manager of study to evaluate possible releases of sediments and PCB from a 4-acre stormwater detention pond operated in batch mode at an active chemical manufacturing facility. The study included storm event flow and suspended sediment sampling using automated ISCO samplers, sediment sampling for grain size analysis, modeling of sediment trapping efficiency of the pond, estimation of PCB potentially released based on mass balance, and calculation of potential impacts on receiving waters. Conducted a scour analysis to evaluate the possibility of erosion near the pond outlet during discharge operations.

Assessment of Hydrodynamics and Evaluation of Sediment Recontamination Potential

Port of Portland, Portland, Oregon

As a Senior Project Specialist, directed development of a field program and modeling study to characterize circulation and sedimentation patterns in Slips 1 and 3 of Terminal 4 at the Port of Portland, Willamette River. Designed and oversaw deployment of sediment traps and analysis of collected data to assess potential for recontamination following dredging or capping.

Evaluation and Refinement of Models for the Lower Fox River

Fox River Group (FRG), Wisconsin

Served as a technical reviewer for the WDNR PCB fate and transport model for the Fox River, Wisconsin, which was used for prediction of long-term PCB exposure trends for various remediation alternatives. Conducted various tests and demonstrative modeling exercises to evaluate proposed changes to the model and evaluate model uncertainty.

Assessment of Increased Flood Potential during Remediation

Confidential Client, Midwest

Senior Engineer overseeing modeling studies for design of remediation measures to address impacted sediment in and around portions of a river and one of its tributaries in the Midwest. The site includes approximately 8 miles of impacted creek and river sediment, banks, and floodplain soils. Since 2003, ARCADIS has been working closely with the local government to assess site hydrodynamics before, during, and after remedial actions using the county's existing USGS Full Equation Model (FEQ) as a foundation. ARCADIS updated the model with recent survey data, checked the calibration, and simulated pre-, during-, and post-remedial conditions, which were also used for restoration design.

Modeling of Contaminated Dredged Material Disposal
U.S. Army Corps of Engineers San Francisco District, Monterey Bay, California
Project Manager of a modeling study in support of a risk-based evaluation of disposal of dredged material from Moss Landing Harbor into Monterey Canyon, part of a national marine sanctuary. Evaluated fate and transport of DDT-containing dredged material from a submerged near-shore disposal pipeline to predict impacts on DDT exposure levels in Monterey Canyon. Model results were used by others for modeling of DDT bioaccumulation in commercial and sport fish species and other receptors of concern for risk assessment. Results were peer-reviewed by an independent panel.

Storm Flow Modeling for Automated Water Quality Sampling Program
Confidential Client, California
As a Senior Project Specialist, conducted surface water hydrologic modeling and flow proportional sampling at a facility in California. Used the HEC-HMS hydrologic model to predict wet and dry season storm hydrographs and volumes at specific locations, for purposes of automated sampling program design. Model predictions also provided design flow rates for potential surface water treatment requirements. ARCADIS improved and calibrated an existing uncalibrated model, using rainfall-runoff data at four gage locations over a 1-year period.

Sediment Stability Assessment
Pilkington North America, Ottawa, Illinois
Senior Engineer, supervised a sediment stability analysis to evaluate likelihood of sediment bed erosion at a sediment deposit impacted by arsenic. Using the RMA2 model, the sediment bed was evaluated during extreme event scenarios (i.e., 100-year flood) to determine sheer strength, bed stability, and potential for erosion. Areas were identified in the riverbed with the potential to erode during extreme events, as well as, areas likely to remain stable.

Storm Flow Modeling for Retrospective Analysis of Potential Water Quality Impacts
Phelps-Dodge Incorporated, Tyrone Mine, New Mexico
As a Senior Project Specialist, conducted a retrospective analysis of potential water quality impacts related to historical storm events using the USACE HEC-HMS model. ARCADIS analyzed meteorological data to statistically assess size, intensity, and trajectory of storms of concern and computed storm hydrographs, which combined with historical data were used to estimate frequency and duration of historical exceedances of water quality standards.

Sediment Stability Prediction in the Mohawk River
Niagara-Mohawk Power Corporation, New York
Technical Manager for bed stability evaluation at a former manufactured gas plant (MGP) site to evaluate remedial options. Directed a hydrodynamic modeling study using the RMA2 model to simulate high flow scenarios, map bed shear stresses, and evaluate erodability. The model was also used to evaluate the potential impact that the proposed remedial options would have on flow

conditions. Directed design and implementation of field studies to support the analysis, including river hydrographic surveys and diver surveys to map bottom types.

Stream Relocation Assessment and Design

Holcim (US), Inc., Portland, Colorado

As a Senior Project Specialist in support of a proposed quarry expansion directed preparation of required agency submittals for Technical Revision No. 6 (TR-6) to the quarry permit. ARCADIS prepared and submitted a quarry permit amendment, which was triggered by the need to relocate an ephemeral stream. ARCADIS' modeling group conducted an engineering and hydraulic analysis (HEC-RAS surface water model) of Bear Creek, a 10-square mile drainage that flows through the property. The HEC-RAS model was used to simulate numerous creek channel designs and a variety of flow and velocity patterns in each potential channel. Based on the model results, the preferred design was included in the permit application.

Residual PCB Loading Analysis

Confidential Client, Rockwell, Kentucky

Senior Project Specialist conducted an investigation to determine the nature of residual PCB loading to a stream that had been remediated by removal of contaminated soft sediment. Designed a field data collection plan to isolate potential source areas and to quantify PCB loading rates. The loading rate analysis led to hypotheses regarding the nature of the residual sources that were addressed through further remedial measures.

Hydrologic Modeling for Treated Stormwater NPDES Permit

Confidential Client, Southeast, U.S.

Project Manager of modeling study to compute appropriate dilution factors for a NPDES permit for discharge of treated industrial stormwater from a PCB impacted site to a small urban stream. Used the HEC-HMS hydrologic model and a water balance for the treatment system to compute actual dilution during non-precipitation periods following storms as opposed to using the traditional 7Q10 method, which is applicable to wet-weather-only discharges.

100-year Floodplain Delineation Study on the River Raisin

Michigan International Speedway, Brooklyn, Michigan

As Project Manager, directed a floodplain modeling study for a portion of the River Raisin, using HEC-RAS and Terra Model that involved specification of site survey requirements, representation of several road crossings, detailed topographic mapping, and flood simulations.

Assessment of Sediment Impacts to Stormwater Releases from a Pond/Wetland System

Southeast Livingston County Inter-governmental Drain Group (SLID), Brighton, Michigan

As part of an infrastructure improvement project, the SLID required assessment of contaminated sediments and water quality in a pond/wetland system adjacent to an industrial complex. As

Project Manager, directed a field investigation and stormwater quality modeling study to evaluate contaminated sediment impacts to stormwater flows through the pond.

Sediment Model Development to Facilitate Nutrient Management in Lake Okeechobee
South Florida Water Management District (SFWMD), South Florida
The SFWMD uses a USEPA WASP model-based water quality model to guide nutrient management for Lake Okeechobee, and sediment phosphorus releases strongly govern long-term water quality. As Project Technical Manager, developed a sediment phosphorus diagenesis submodel and implemented improvements to increase the model's ability to forecast the effects of nutrient management and sediment remediation.

Technical Review and Critique of Modeling Analysis of Water Quality Impacts from the Folsom Reservoir Dredging Project
SAFAC, Folsom Reservoir, California
As Senior Project Specialist, conducted a technical peer review of a modeling analysis of dredge plume mixing zones and turbidity entrainment in drinking water reservoir outflows conducted by the USACE for Folsom Reservoir, California. Review comments led to additional modeling analysis to better define the worst-case scenario for water quality impacts.

Selected Publications

Erickson, M.J., C.R. Barnes, M.R. Henderson, R. Romagnoli, and C.E. Firstenberg. 2006. Geomorphology-Based Interpretation of Sedimentation Rates from Radiodating, Lower Passaic River, New Jersey. Integrated Environmental Assessment and Management (Accepted for publication in IEAM 3(2)-April 2007 Issue).

Bohlen, W.F., and M.J. Erickson. 2006. Incorporating Sediment Stability Within the Management of Contaminated Sediment Sites: A Synthesis Approach. Integrated Environmental Assessment and Management, 2(1):24-28.

Erickson, M.J., C.L. Turner, and L.J. Thibodeaux. 2005. Field Observations and Modeling of Dissolved Fraction Sediment-Water Exchange Coefficients for PCBs in the Hudson River. Environmental Science and Technology, 39(2):549-556.

James, R.T., V.J. Bierman, M.J. Erickson, and S.C. Hinz. 2005. The Lake Okeechobee Water Quality Model (LOWQM) Enhancements, Calibration, Validation and Analysis. Lake and Reservoir Management, 21(3):231-260.

Erickson, M.J., and M.T. Auer. 1998. Chemical Exchange at the Sediment-Water Interface of Cannonsville Reservoir. Journal of Lake and Reservoir Management, 14(2-3):266-277.

Conference Proceedings

Henderson, M.R., S.D. Messur, M.J. Erickson, J.F. Morgan. 2005. Riverbed Stability Assessment to Evaluate Remedial Alternatives: A Case Study. Paper C5-04, in: R.F. Olfenbuttel and P.J. White (Eds.), Remediation of Contaminated Sediments—2005: Finding Achievable Risk Reduction Solutions. Proceedings of the 3rd International Conference on Remediation of Contaminated Sediments (New Orleans, Louisiana; January 24–27, 2005).

Erickson, M.J., J.W. Davis, T. Dekker, V. Magar, C. Patmont, and M. Swindoll. 2003. "Sediment Stability Assessment to Evaluate Natural Recovery as a Viable Remedy for Contaminated Sediments." Proceedings of the 2nd International Conference on Remediation of Contaminated Sediments. September 30-October 3, 2003, Venice, Italy.

Davis, J.W., T. Dekker, M.J. Erickson, V. Magar, C. Patmont, and M. Swindoll. 2003. "Framework for Evaluating the Effectiveness of Monitored Natural Recovery (MNR) as a Contaminated Sediment Management Option." Proceedings of the 2nd International Conference on Remediation of Contaminated Sediments. September 30-October 3, 2003, Venice, Italy.

Patmont, C., J. Davis, T. Dekker, M.J. Erickson, V.S. Magar, and M. Swindoll. 2003. "Natural Recovery: Monitoring Declines in Sediment Chemical Concentrations and Biological Endpoints." Proceedings of the 2nd International Conference on Remediation of Contaminated Sediments. September 30-October 3, 2003, Venice, Italy.

Magar, V.S., J. Davis, T. Dekker, M.J. Erickson, D. Matey, C. Patmont, M. Swindoll, R. Brenner, and C. Zeller. 2003. "Characterization of Fate and Transport Processes: Comparing Contaminant Recovery with Biological Endpoint Trends." Proceedings of the 2nd International Conference on Remediation of Contaminated Sediments. September 30-October 3, 2003, Venice, Italy.

Erickson, M.J. 2002. "A Protocol for Predicting Environmental Benefits of Dredging Using Fate and Transport Models." Proceedings of ASCE Dredging '02 Conference, Orlando, Florida. May 5-8, 2002.

Presentations

Erickson, M.J., G.L. Loveland, M.M. Bowman, D.J. Wilburn, and P.K. Radigan, 2007. "In-the-Dry Dredging of Riverine CKD Sediments in Cold-Weather Conditions: A Case Study." Paper accepted for presentation at the WDCON XVIII Conference, Orlando, Florida. May 27-June 1, 2007.

Erickson, M.J., R.K. Mohan, W.J. Dinicola, and M.R. Henderson. 2007. "Targeted Dredging of Near-Shore Debris and Sediment, Upper Trenton Channel, Detroit River: A Case Study." Paper

accepted for presentation at the WDCON XVIII Conference, Orlando, Florida. May 27-June 1, 2007.

Bartee, M., D. Edge, M.J. Erickson, and J. Sueker. 2004. "Implementation of Copper Regulations Based on the Biotic Ligand Model (BLM): Challenges and Opportunities." Paper presented at The Society of Environmental Toxicology and Chemistry 25th Annual Meeting in North America, Portland, Oregon. November 14-18, 2004.

Erickson, M.J., and J.Z. Gailani. 2004. "Physical and Chemical Stability of Contaminants in Sediments: Using Multiple Lines of Evidence." Paper presented at the USACE/USEPA/SMWG Joint Sediment Conference, Addressing Uncertainty and Managing Risk at Contaminated Sediment Sites, St. Louis, Missouri. October 26-28, 2004.

Thibodeaux, L.J., M.J. Erickson, and C.L. Turner. 2004. "Annual Cycle Patterns of Field Stabilization Mass-Transfer Coefficients PCBs in Bed-Sediment and Lotic Macroecology Drivers." Paper presented at the ASLO 2004 Summer Meeting, The Changing Landscapes of Oceans and Freshwater, Savannah, Georgia. June 13-18, 2004. Nadeau, S.C., and M.J. Erickson. 2002. "Surviving in the Next Frontier: A Perspective on Key Sediment Issues." Presentation at the Air and Waste Management Association-East Michigan Chapter 2002 Spring Conference, Plymouth, Michigan.

Erickson, M.J., C.L. Turner, and L.J. Thibodeaux. 2001. "Calculation of Effective Sediment-water Transfer Rates for 12 PCB Congeners in the Thompson Island Pool, Hudson River, New York." Presentation at the Society of Environmental Toxicology and Chemistry Conference, Baltimore, Maryland. November 14, 2001.

Erickson, M.J., C.L. Turner, and L. Thibodeaux. 2001. "Demonstration of a 2-Layer Mechanistic Model of Non-Resuspension Sediment-Water Transfer of PCB." Presentation at the International Association for Great Lake Research Conference, Green Bay, Wisconsin. June 10-14, 2001.

Holmberg, H., J.V. DePinto, and M.J. Erickson. 2001. "Assessment of Sediment Remediation Using Contaminant Transport and Fate Models." Presentation at the International Association for Great Lake Research Conference, Green Bay, Wisconsin. June 10-14, 2001.

Wolfe, J.R., M.J. Erickson, T. Chisholm, H. Holmberg, R.D. McCulloch, and J.V. DePinto. 2001. "Comparison and Critical Analysis of Sediment Erosion Measurement Devices." Presentation at the International Association for Great Lake Research Conference, Green Bay, Wisconsin. June 10-14, 2001.

Erickson, M.J. 2001. "The Role of Modeling in Assessing Management Alternatives." Presentation at the USEPA Forum on Managing Contaminated Sediments at Hazardous Waste Sites, Alexandria, Virginia. May 30-June 1, 2001.

Erickson, M.J., and G.W. Peterson. 2001. "The Role of Modeling in Assessing Natural Attenuation. Presentation at the Remedial Technology Demonstration Forum – Sediment Remediation Action Team Meeting." NOAA Sand Point, Seattle, Washington. January 24-25, 2001.

Bierman, V.J., S.C. Hinz, and M.J. Erickson. 1999. "Modeling PCB in the Upper Hudson River." Presentation at the Society of Environmental Toxicology and Chemistry. Philadelphia, Pennsylvania. November 14-18, 1999.

Butcher, J.B., E. Garvey, and M.J. Erickson. 1999. "Estimating PCB Load from the Upper Hudson River." Presentation at the Society of Environmental Toxicology and Chemistry, Philadelphia, Pennsylvania. November 14-18, 1999.

Erickson, M.J., V.J. Bierman, Jr., S.C. Hinz, K.R. Reddy, and R.T. James. 1998. "A Sediment Phosphorus Model of Lake Okeechobee." Paper presented at the Southeastern Lake Management Society, Orlando, Florida.

Erickson, M.J., and M.T. Auer. 1996. "Measurement of Chemical Exchange at the Sediment-Water Interface of Cannonsville Reservoir, New York." Presentation at the North American Lake Management Society Annual Conference, Toronto, Canada.

Erickson, M.J., and M.T. Auer. 1996. "Determination and Verification of Sediment-Water Chemical

Exchange Rates in Cannonsville Reservoir, New York." Presentation at the American Water Resource Association Annual Symposium, Syracuse, New York.

Invited Presentations/Workshops

Panel session chair. Sediment Stability. Battelle Third International Conference on Remediation of Contaminated Sediments, New Orleans, Louisiana. January 2005.

SERDP/ESTCP Contaminated Sediments Workshop to establish research and funding priorities. August 10-11, 2004.

A Framework for Sediment Stability Assessment at Contaminated Sediment Sites, Sediment Management Work Group meeting. Chesterton, Indiana. October 2003.

ARCADIS

Education
BS, Civil Engineering, Union College, 1991

Years of Experience
Total - 18
With ARCADIS - 18

Professional Registrations
Professional Engineer, NY, since 1996
Professional Engineer, MI, since 1998

Professional Associations
American Society of Civil Engineers
National Society of Professional Engineers (NSPE)

Bill Rankin

Principal Engineer/Vice President

Mr. Rankin has more than 18 years of experience in the areas of civil/ environmental engineering and construction oversight; design, construction, and closure of waste disposal facilities; and RD/RA activities associated Superfund sites.

Project Experience

Engineering Design
Western Michigan
Manages the engineering design related to the closure/remediation of five operable units associated with a large Superfund site. Each operable unit consists of a 5+-acre former waste disposal area located in close proximity to a large river or one of its tributaries. Responsible for design elements of stormwater drainage systems, gas venting systems, and leachate collection systems.

Contract Drawings and Technical Specifications
New Jersey
Served as the team leader for the preparation of contract drawings and technical specifications for a concrete cap installed above contaminated soils at a petroleum storage facility. The concrete cap is used as a parking facility.

Closed Landfill Inspections
New York
Performed several semi-annual inspections of a closed landfill to determine effectiveness of closure measures and potential impacts to the surrounding environment. Prepared inspection reports and provided client with recommendations for use in negotiations with the NYSDEC.

Geosynthetic-Reinforced Walls Design
Southern New York
Designed two 30-foot tall geosynthetic-reinforced walls at a municipal solid waste landfill. The walls were necessary to cap the landfill without infringing on nearby properties.

Design, Construction, and Operation of On-Plant Consolidation Areas
Western Massachusetts
Serves as the project manager for the design, construction, and operation of two on-plant consolidation areas at a former industrial site. One on-plant consolidation area is used for the

disposal of TSCA materials and consequently is lined with an HDPE liner and a multi-component leachate collection system.

Berm Stability Analyses

Ohio

Performed berm stability analyses of two liquid storage ponds. Analyses were performed to evaluate potential for failure by sliding, piping, and scour by a nearby creek. Provided letter summary to client for submission to Ohio EPA.

Peer Review of Contract Drawings and Closure Plan

Central New York

Provided peer review of contract drawings and closure plan, supervised QA/QC testing activities, and provided construction management services for the installation of the low permeability soil barrier component of a final cover system for a 6-acre landfill.

Onsite Construction Observation and Project Coordination

Western New York

Engineer responsible for onsite construction observation and project coordination with the general contractor during installation of approximately 20 acres of final cover for a solid waste disposal facility. Supervised and documented QA/QC testing and sampling of all soil materials to ensure material conformance with Part 360 regulations and the approved QA/QC report.

Onsite Construction Observation and Project Coordination

Central New Jersey

Performed onsite construction observation and project coordination with the general contractor during implementation of a large multi-faceted remedial action at a Superfund site. Remedial activities included installing approximately 30 acres of final cover including textured geomembrane and geosynthetic drainage net, constructing a 200,000-square-foot soil-bentonite cut-off wall, and installing a 50-foot-deep perimeter leachate collection system within the cut-off wall.

Design, Permit Drawings, and Calculation Packages

Ohio

Performed the design and prepared permit drawings and calculation packages for two solid waste disposal facilities, each more than 130 acres in size. Designs incorporated innovative uses of textured geomembranes, geocomposite drainage layers, geosynthetic clay liners, alternative daily covers, passive gas venting systems, and leachate collection and removal systems composed of submersible pumps and sidewall riser pipes.

Permit Peer Review

Peer reviewed a permit to construct and operate a recyclables handling and recovery facility to determine compliance with Part 360 regulations.

On-Site Construction Observation and Project Coordination

Project engineer responsible for on-site construction observation and project coordination with a confidential client and the general contractor during installation of a spring water collection system for a municipal potable water supply facility. Prepared construction progress reports and developed record drawings.

Final Cover System Design; Contract Documents and Drawings

Central New York

Designed final cover system and prepared contract documents and drawings for a 14-acre solid waste disposal facility. Designed landfill cover, including gas venting systems, in conformance with 6 NYCRR Part 360 requirements.

Closure Plan, Contract Drawings, and Technical Specifications

Long Island, New York

Prepared closure plan, contract drawings, and technical specifications for a 53-acre Superfund site closure. All work was performed in accordance with Part 360 regulations, the Record of Decision, and the Administrative Order on Consent.

Liner System Design

Designed liner system for a waste storage and treatment lagoon at a food processing facility. Design incorporated 60-mile HDPE geomembrane and a geosynthetic gas removal system with passive vents at the crest of the berms.

Project Management

Served as the project manager responsible for evaluating remedial alternatives, developing detailed construction cost estimates, and designing the alternative selected for closure of two concrete bunker pesticide storage facilities. Closure involved installation of cover system composed of a low permeability barrier soil layer, a CSPE-R liner and geotextile composite, and protection soils.

Project Management

Western New York

Project manager responsible for preparation of contract documents and drawings, overseeing QA/QC testing, and project coordination for the installation of approximately 16 acres of final cover at a solid waste landfill. Prepared construction progress summary reports, supervised geotechnical testing, and prepared engineering certification report.

Onsite Construction Observation

New York

Provided onsite construction observation during installation of New York State's first double composite liner system with primary and secondary leachate collection systems at a 14-acre solid waste disposal facility. Performed onsite QA/QC testing of subbase soil, clay liner, 60-mil HDPE geomembrane, and drainage sand.

Technical Designs, Work Plans, Bidding Documents

Western Massachusetts

Serves as the project manager responsible for the preparation of technical designs, work plans, bidding documents, etc., related to the demolition of several former manufacturing buildings located at an industrial facility.

ARCADIS

Education
MS, Civil Engineering, University of Nevada, Reno, NV, 1989
BS, Geoscience, SUNY Buffalo, Buffalo, NY, 1980

Years of Experience
Total - 24
With ARCADIS - 19

Patrick N. McGuire

Associate

Mr. McGuire has more than 24 years of experience in the investigation, remedial design, and remediation of hazardous waste-impacted soils and groundwater, with a special emphasis on bioremediation. His other areas of expertise include design, management, and execution of treatability studies in support of full-scale site remediation, hydrogeologic and hydrologic evaluation, subsurface geology, and geologic mapping.

Project Experience

Remedial Investigation/Feasibility Study
Kalamazoo, Michigan
Project manager contributing to Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund site RI/FS concerning PCBs and other hazardous material-impacted soils, sediments, groundwater, surface water, and air. Responsibilities include evaluating and summarizing current situation; negotiating and developing RI/FS work plans, technical memoranda, and RI/FS reports; and managing overall RI/FS activities.

Landfill Closure
Kalamazoo, Michigan
Project coordinator for the landfill closure. Responsibilities included coordinating engineering services from two independent engineering firms, preparation of work plans for associated sediment and soil removal and consolidation activities, interaction with regulatory agency, preparation of planning documents for landfill closure, management of construction oversight team, and preparation of closure report.

Sediment Removal Interim Action
Kalamazoo, Michigan
Project manager for the removal action at a CERCLA site Operable Unit. Responsibilities included preparation of Interim Action Work Plan and associated planning documents, interaction with regulatory agencies, management of oversight team, and preparation of Removal Action Summary report.

Design of Solid-Phase Bioremediation Land Treatment Unit
Participated in the design of the treatment unit at a railroad wood-treatment facility impacted with creosote.

Soil and Groundwater Remediation
Rhode Island
Participated in remediation at a former fuel storage terminal. Designed/implemented a composting operation for treating unsaturated soil. Evaluated local hydrogeology and possible migration pathways at the terminal, developing the groundwater remedial action plan, and preliminary design of groundwater remediation unit process.

Feasibility Evaluation
Confidential Client
Evaluated site characteristics and laboratory biological tests to determine the feasibility of in-situ bioremediation for service stations. Put projects at different locations in separately.

Feasibility Evaluation
Confidential Client
Evaluated site characteristics and laboratory biological tests to determine the feasibility of in-situ bioremediation for service stations. Put projects at different locations in separately.

Feasibility Evaluation
Confidential Client
Evaluated site characteristics and laboratory biological tests to determine the feasibility of in-situ bioremediation for service stations. Put projects at different locations in separately.

Assessment of Subsurface Soil Contamination
Assessed contamination from a waste oil lagoon and the influence on surrounding wetlands. Designed and managed treatability studies to aid in developing in-situ bioremediation plan. Evaluated and provided preliminary design of wetlands protection and reconstruction program.

Document Development
Managed the development of a document that reviewed enhanced recovery techniques to remove coal tar from soil and groundwater. The document supports field-scale testing of several recovery techniques at a former MGP.

Development of Offshore Oil Prospects
Western Mediterranean
Participated in development of offshore oil prospects. Evaluated subsurface geologic, geochemical, and geophysical data.

Development of Offshore Oil Prospects
Caribbean Sea
Participated in development of offshore oil prospects. Evaluated subsurface geologic, geochemical, and geophysical data.

Development of Offshore Oil Prospects
Persian Gulf
Participated in development of offshore oil prospects. Evaluated subsurface geologic, geochemical, and geophysical data.

Development of Offshore Oil Prospects
East China Sea
Participated in development of offshore oil prospects. Evaluated subsurface geologic, geochemical, and geophysical data.

Remediation of Solvent-Impacted Subsurface Soils
Managed the remediation and assessed site characteristics, contamination, and remedial options. Designed biotreatment area.

Treatability Studies
Managed laboratory studies investigating treatability of subsurface soils and water impacted with jet fuel (JP-5). Responsibilities included designing and executing bench-scale treatability studies to examine rates of biodegradation for various concentrations and treatment conditions. Results are being used to design and implement in-situ bioremediation of an impacted aquifer. Also evaluated direct oxidation and vapor extraction. Prepared semi-annual and final reports.

Treatability Study
Managed the study to assess the potential for enhancing biodegradation of PCE- and TCE-impacted soil and groundwater by amending site groundwater with acetate, ethanol, and lactate. Provided technical support for the design of a field-scale study using calcium acetate amended groundwater.

Bench-Scale Treatability Study
Managed the study where site groundwater and soil were treated with amended groundwater. Groundwater was amended with acetate, ethanol, and lactate to assess which amendment would enhance biodegradation of chlorinated solvents. Results were encouraging and a pilot-scale testing program is planned for 2004. Updates?

Bench-Scale Treatability Study
Managed the study for the bioremediation of soil impacted with hydraulic fluids. Upon completing the study, provided technical advice for the design and operation of a solid-phase bioremediation treatment unit.

Bench-Scale Treatability Studies

New York State Thruway Authority, New York

Managed the studies for several facilities. Upon completing the bench-scale studies, designed a bioremediation treatment system that includes the use of recirculation of nutrient-amended air stripper effluent, and the injection of hydrogen peroxide and nutrient-amended solutions.

Design of Soil Venting Program

Designed the program for an industrial client to address a hexane spill from a UST.

In-Situ Bioremediation Project

Provided technical assistance during full-scale implementation of the project, which addressed 20,000 cy of soil impacted by VOCs and SVOCs. The remedial objectives were met within 6 months.

In-Situ Bioremediation Project

Ohio

Provided technical expertise for implementation of the project at a truck manufacturing facility.

Remedial Plan

Managed remedial plan of diesel fuel spill that impacted soil and groundwater. Responsibilities included evaluating treatability studies and developing in-situ bioremediation design.

Feasibility Study

Eastern New York

Project manager for the FS associated with an aquatic site. Responsible for preparation of the FS that evaluated remedial alternatives for several different components of the site including a small pond, two tributaries, and a man-made lake.

Field-Scale Study

Newark, New Jersey

Provided technical support for the study using a chemical oxidation process to treat chlorinated solvent impacted groundwater.

Assessment and Design of In-Situ Biological Remediation Alternatives

Tennessee

Provided technical assistance for assessing and designing the alternatives for TCE-impacted groundwater at a manufacturing site. Design alternatives included injection of methane and nutrient amended water into the aquifer. PLFA was used to assess the reaction of the methane oxidizing bacteria to amended groundwater. Assessment of the geochemical and biological parameters determined aquifer conditions would support stimulation of methane oxidizing bacteria.

In-Situ Anaerobic Bioremediation Remedy

Syracuse, New York

Provided technical support for implementation of the remedy at a former solvent recovery facility. The remedy includes injection of groundwater amended with an anaerobic mineral media and alternative electron acceptors.

Modeling Benzene Degradation

West Virginia

Provided technical support for modeling benzene degradation in a groundwater system. Estimated benzene degradation rates using site PLFAs geochemistry data. Identified prevalent microbial communities within the benzene plume and determined an estimate of benzene biodegradation rate.

Testing of Biovent System

Managed the bench- and pilot-scale testing of a biovent system to treat gasoline-impacted soil. Upon completing the pilot-scale test plan, developed a basis of design document to assist the client in contractor bidding and construction of the full-scale system.

Assessment of Natural Attenuation Alternative

Technical advisor supporting the assessment of the alternative at several MGP sites. Evaluated Phospho Lipid Fatty Acids (PLFA) and DNA data in the natural attenuation assessment.

Chemical Oxidation Alternative at MGP Site

New York

Technical advisor supporting the use of a chemical oxidation alternative at a manufactured gas plant (MGP) site.

In-Situ Bioremediation Program

New Jersey

Designed soil-vapor extraction system using screened monitoring wells as part of the program performed in response to a hydrocarbon spill.

Evaluation of Water Distribution System

Carson Desert, Nevada

Evaluated local hydrology and hydrogeology of the water distribution system. Quantitatively determined aerial precipitation, aquifer recharge, evapotranspiration, surface-water/soil interactions, and soil properties. Prepared final project report.

Chemical Oxidation Alternative at Landfill

New Jersey

Technical advisor supporting the use of a chemical oxidation alternative at a landfill.

Solid-Phase Bioremediation Treatment Unit Project

New York

Managed the evaluation of existing data, design, negotiation, and implementation of the unit, which is the largest in the state and treats approximately 12,000 cy of soil per treatment season. The soil is impacted with an organic solvent and hydraulic fluids.

Bioremediation Bench-Scale and Field-Scale Studies

Syracuse, New York

Project manager for the studies to evaluate and compare the effectiveness of two solid-phase biological techniques at an inactive hazardous waste site. Assisted in negotiating technology-based cleanup objectives. The field study for this project was the recipient of the Engineering Excellence Grand Award from the New York Consulting Engineers Council.

Air-Sparging Field Study

Michigan

Provided technical expertise for the study at a fuel storage facility.

Remediation of Fuel-Oil-Impacted Soil and Groundwater

Developed plan for the remediation. Responsible for evaluating local hydrogeology and designing in-situ bioremediation/activated carbon treatment system.

Evaluation and Modification of Dual-Phase Vapor Extraction

Provided technical advice for the evaluation and modification of the extraction to enhance biological treatment of soil impacted with cutting oils and total petroleum hydrocarbons.

Remediation of Creosote-Impacted Soil and Groundwater

Coordinated the remediation at a former wood-treating facility. Evaluated product recovery system, physical and biological treatment unit operations, and land treatment unit. Assessed in-situ bioremediation as a remedial option.

Evaluation of Natural Attenuation

Provided technical advice for the evaluation of natural attenuation of TCA-impacted groundwater. Assisted in the review of existing data and design of monitoring plan.

Evaluation of Remedial Techniques

Provided technical advice for the evaluation of remedial techniques for soil and groundwater impacted with tar at a former MGP site.

Bench-Scale Test

Provided technical advice for the evaluation of bioremediation of soil impacted with waste oil,

including hydraulic fluids. The results of the bench-scale test were used to develop and design a solid-phase bioremediation treatment unit.

Pilot-Scale Test

Provided technical advice for the testing of bioremediation of PCB oil-impacted sediments. The test consisted of anaerobic and aerobic treatments in a constructed confined treatment facility.

Operation and Maintenance of Land Treatment Demonstration Site

Coordinated the O&M of oil refinery's land treatment demonstration site. Responsible for daily monitoring and scheduling of waste application, statistical analysis of soil and soil pore sampling results to confirm proper operation of facility, and preparing reports required by regulatory agency.

Remedial Plan and Redesign of Land Treatment Unit

Developed remedial plan and redesign of an active unit. Assessed aerial extent of buried refinery sludge, removed buried waste, and redesigned treatment unit.

Full-Scale In-Situ Anaerobic Biological Treatment Operation

Technical advisor supporting the operation. The process was tested at bench-scale with success, thus the client approved using a full-scale operation to treat groundwater impacted with SVOCs and VOCs.

Selected Publications

McGuire, P.N., and D.J.Ulm. 1996. Bioremediation of unsaturated soil. Remediation Management 2(3): 42-50.

Watts, R.J., P.N. McGuire, and R.E. Hoeppel. 1993. A simple method for conducting laboratory treatability studies to assess potential for in-situ bioremediation. Biotechnology Techniques 7(5): 385-390.

McGuire, P.N., and R.J. Watts. 1988. Engineering Laboratory Investigation of Field In-Situ Bioreclaimation at NAS Patuxent River, Maryland: Final Report 1988. Naval Civil Engineering Laboratory Contract N 62583/87 MX 848, 1988.

Presentations

Lipson, D.S., and P.N. McGuire. 1996. Demonstrating the natural attenuation of chlorinated VOCs in groundwater using spider diagrams. In Proceedings of the Petroleum Hydrocarbons and Organic Chemicals in Ground Water: Prevention, Detection, and Remediation Conference, National Ground Water Association.Houston, Texas.

McGuire, P.N., D.J. Ulm, and C.F. Dousharm. 1995. "Full-Scale Bioremediation of Unsaturated Soil Using In-Situ Blending." Presentation at the International Symposium and Trade Fair on the Clean-up of Manufactured Gas Plants, September 19-21, Praque, Czech Republic.

McGuire, P.N., and A.T. Silfer. 1995. "Use of Chromatograms to Assess Characteristics and Transformation of Environmentally Exposed Hydrocarbons." Presentation at Superfund XVI, November 6, Washington, D.C.

Ulm, D.J., P.N. McGuire, and M.P. Brown. 1993. "A Case Study of a Field Scale Pilot Study Comparing Two Solid-Phase Bioremediation Techniques." Presentation at Superfund XIV, November 30, Washington D.C.

McGuire, P.N., and M.P. Brown. 1992. "Use of Internal Standards to Verify Bioremediation." Presentation at the New York Water Resources Association Annual Meeting, October 21, Albany, New York.

McGuire, P.N. 1992. Practical consideration in the design and implementation of in-situ bioremediation. ASME Eco-World, Washington, D.C.

Brown, M.P., P.N. McGuire, and K. Jaglal. 1991. "Performance Criteria for Anaerobic PCB Dechlorination Technology." Presentation at the Society of Environmental Toxicology and Chemistry 12th Annual Meeting, November 3-7, Seattle, Washington.

Watts, R.J., P.N. McGuire, and H. Lee. 1989. "Effects of Concentration and the Biological Degradation of Petroleum Hydrocarbons Associated with In-Situ Soil Water Treatment." Presentation at the ACSE/NCEE Annual Conference, July 10-12, Austin, Texas. Contributor - Department of Defense Biotechnology Conference, February 21-24, Monterey, California.

McGuire, P.N., R.J. Watts, and H. Lee. 1998. "Investigation of Factors Influencing Biodegradation in a Contaminated Shallow Soil Water System." Presentation at the Nevada Water Pollution Control Association Annual Meeting, October 17-19, Las Vegas , Nevada .

McGuire, P.N., and R.J. Watts. 1987. "Determination of Parameters Influencing In-Situ Decontamination of a Shallow Soil Water System." Presentation at the Nevada Water Pollution Control Association Annual Meeting, October 19-21, Reno, Nevada.

ARCADIS

Education
BS, Environmental Science, Lehigh University, Bethlehem, PA, 1993

Years of Experience
Total - 15
With ARCADIS - 9

Megan F. Eves

Senior Scientist, Environmental Communications

Ms. Eves has more than 15 years of professional experience in the environmental sciences. Her technical expertise and public communication skills are a valuable asset on a wide variety of sediment and environmental cleanup projects. As a co-manager of ARCADIS' Environmental Communications Services group, she develops and implements public outreach efforts for environmental cleanup projects and manages the technical writing, reviewing, and editing of a wide variety of project-related documents. Recent work has included a new focus on outreach efforts that maximize the effectiveness of project websites to communicate information to project stakeholders and the community via interactive site tours, video clips, maps, and graphics.

Ms. Eves' work has focused on creating materials for community relations and public outreach; developing remedial investigations and feasibility studies for contaminated sediment sites; producing and editing technical documents; promoting compliance with federal and state environmental regulations; and developing, implementing, and managing air quality improvement programs. Ms. Eves also supports project teams by tracking environmental issues in the media, and leading efforts to respond when necessary through the use of press releases, fact sheets, and briefing materials for elected officials and other stakeholders.

The public outreach and communications materials Ms. Eves has developed have helped foster more positive interactions between ARCADIS's clients and the communities in which they work. Often the materials are developed to help manage public perception and involvement in remedial decisions for an industrial site, which is particularly important when local residents may be personally affected by potential environmental issues.

Ms. Eves has worked on more than 30 different sediment management, environmental investigation, and remedial design/remedial action projects for ARCADIS – highlights of the most significant efforts are described below.

Project Experience

Kalamazoo River Superfund Site Project
Kalamazoo, Michigan
For the Kalamazoo River Superfund Site, has been a key contributor to a wide variety of technical and public outreach efforts. "Translates" multifaceted scientific and technical topics into clear, understandable language, which has helped in the effort to communicate important issues on this

complex PCB site to the public, regulators, and local groups. Has developed and contributed to documents that have been widely distributed throughout the Kalamazoo region.

Efforts over the past nine years have included the coordination of a large technical team (dozens of internal staff from entry-level engineers and scientists to vice presidents and clients) to develop a wide variety of technical documents and supporting materials to communicate consistent messages about the project, both from a technical standpoint and a client advocacy perspective. Outreach efforts have included developing materials to foster interagency cooperation, raise awareness among elected officials, and keep community members involved and informed during large-scale RI/FS, risk assessment, and other activities on this 80 miles of river impacted with PCBs. Have worked with outside counsel, outside public relations teams, and all technical personnel to maintain continuous and extensive outreach and stakeholder involvement.

As part of a long-term community relations program, responsible for management, content development, and design of ARCADIS' first project-specific public website (www.kzooriver.com). The site – the Kalamazoo River Webline – serves as an outreach tool to proactively address emerging and existing issues regarding the river, providing access to project updates, answers to frequently asked questions, and a photo tour of the 75-mile site. During the two-year implementation of a Time Critical Removal Action to remove PCB-containing sediments and soils from behind the former Plainwell Impoundment, managed the development and posting of a weekly construction update report that included text, photographs, and a project area map to track progress. Also works with team members to keep the site up to date, and to post the latest project news and technical reports. This website now serves as the standard as other project managers contemplate developing sites for their clients.

Have served as the primary author, contributing author, designer, or key technical editor for a variety of materials ranging from executive summaries, effective graphical/textual section summaries for technical reports, explanatory documents on risk assessment and remedial design/action, project fact sheets, briefing materials for media/management/elected officials/agency staff, and a comprehensive conceptual model figure of the Site.

Community Outreach for Coastal Site Remediation and Redevelopment
Fort Bragg, California
Supports the ongoing design and implementation of a comprehensive community outreach strategy (targeting 9,000 people) to rebuild credibility and project momentum in a low-trust environment following closure of a former manufacturing facility in northern California. The 415-acre site is located on the Pacific coast, and is contaminated with petroleum hydrocarbons, PCBs, metals, and dioxins from over 100 years of industrial use. Due to success of the program and increasing public support, previously stalled remedial plans and construction activities were initiated, leading to more cost-effective and time-efficient progress. Comprehensive environmental

cleanup activities are in progress, and plans are now underway to cooperatively design options for redevelopment of the site for recreation, tourism, and mixed-use residential/commercial reuse.

In spring 2008, Ms Eves assumed the lead role for enhancing the project website developed for the public, and has incorporated innovative and dynamic use of video and mapping elements to create virtual tours of the site (since the property is not accessible to people in the town), added a Spanish-language page, and updated the design and content. Also supports a wide range of community activities such as open houses, workshops, and work at the staffed local project center.

Anniston PCB Site

Anniston, Alabama

Work on this large, complex contaminated sediment site has ranged from authoring and editing technical reports on risk assessment, natural resource damages assessment, environmental investigations, sampling programs, and data summaries to developing materials for meetings and creating handouts for the public to describe on-site efforts. Helps manage the development of work products, coordinating the efforts of nationally-recognized technical experts, engineers and scientists, support staff, and client representatives. Also has contributed to the development of detailed technical comments on reports authored by USEPA consultants, and responses to comments on ARCADIS documents submitted by regulatory reviewers.

Lake Okeechobee Sediment Management Feasibility Study

South Florida

On this three-year project, made a significant contribution to the effort to fully assess the internal phosphorus-loading problem in the second-largest lake in the continental United States, and to develop viable remedial options for this potentially precedent-setting project. Remediation of Lake Okeechobee is a highly visible undertaking as it is the headwaters to the Everglades, and is part of the multibillion dollar effort to restore South Florida's most significant ecosystem.

Conducted extensive research of scientific literature to address the effects of phosphorus loading and potential remedies on submerged aquatic vegetation, benthic macroinvertebrates, planktivorous and piscivorous fish, snail kites, alligators, and the endangered manatee and Okeechobee gourd.

Identified and analyzed potential remedial options, including biomanipulation, lake-stage management, artificial circulation, chemical treatment, dredging, sediment disposal and treatment, and beneficial reuse opportunities. Developed an understanding of socioeconomic issues in the diverse five-county area, state and federal permitting requirements, and irrigation and drinking-water needs.

Coordinated and interacted with multiple technical subcontractors (all holders of the Ph.D. in their respective fields) and internal technical staff, the client, and state and federal environmental agencies. Coordinated the development and finalization of all deliverables. Designed and implemented the public and interagency outreach program to aggressively communicate program goals and status, gather critical technical and public input, and build widespread support for potential remedial measures. Primary author of fact sheets, newspaper notices, public meeting materials, and content for the project website; also managed maintenance of a more than 800-record database to track public interest and involvement.

Onondaga Lake Canalways Trail Project

Syracuse, New York

Responsible for community outreach efforts and environmental assessments related to the trail project, which is a locally-significant project that will result in a continuous trail around the lake with links to other area trails. Developed materials for project team and public meetings, developed formal responses to public comments, and coordinated interaction with the primary contractor, various public agency representatives (County Departments of Transportation, Parks and Recreation, and Office of the Environment; State Departments of Transportation and Environmental Conservation), and other subcontractors as well as the public.

RCRA Public Involvement Program

Wisconsin and Illinois

Designed and implemented Resource Conservation and Recovery Act (RCRA) public involvement programs for polynuclear aromatic hydrocarbon- (PAH-) impacted aquatic sites on behalf of a firm managing environmental liabilities at numerous operating and legacy wood-treatment sites. Contributions have included writing public involvement plans, community fact sheets, and monthly construction update reports for the local Mayor's office.

Remedial Alternatives Report

Northern New York

For a contaminated sediment site, collaborated on the development of a report analyzing a wide range of remedial alternatives for a river. Responsibilities included serving as primary author of the executive summary and report introduction, as well as providing detailed, technical review of the development and evaluation (versus Comprehensive Environmental Response, Compensation, and Liability Act [CERCLA]/National Contingency Plan [NCP] criteria) of the potential remedial alternatives.

Prior to joining ARCADIS, Ms. Eves served as a program specialist for the Pennsylvania Department of Environmental Protection's (PADEP) Bureau of Air Quality where she won multiple awards for outstanding individual and team efforts. Responsibilities during her six years with the PADEP were both state-wide and regional in nature, and ranged from public speaking engagements and writing/revising/interpreting regulations for the regulated community and the

public, to serving on national and state technical/policy committees, including the USEPA's Federal Advisory Committee for ozone, particulate matter, and regional haze.

Ms. Eves was responsible for developing, implementing, and managing a variety of programs designed to improve air quality in Pennsylvania, ranging from traditional regulatory programs (oxygenated and reformulated gasoline, an award-winning employer commuting trip reduction program, state-wide emissions reductions plans), to voluntary citizen-based action programs (community ozone action days, Earth Week activities). Ms. Eves secured department approval to design and implement an innovative, award-winning lawnmower buy-back program for Southeast and South-Central Pennsylvania that, in its first two years, resulted in the retirement of nearly 1,000 highly-polluting lawnmowers, reducing emissions of carbon monoxide, volatile organic compounds (VOCs), and nitrogen oxides in critical areas of the state. She also served as primary contact for the PADEP on issues related to gasoline and diesel fuel regulation, quality, and composition; assisted in air toxics monitoring report development, as well as public health risk assessment evaluations for cement kilns and trash-to-steam plants; and, by special request, assisted the Secretary of the Department in organizing the first Ozone Transport Commission technology conference.

At the PADEP, Ms. Eves gained critical experience producing and editing a variety of technical documents including environmental regulations and public education materials, developing products for internal and external use such as educational fact sheets and newsletters, technical comments on federal regulations and proposals, analysis of state and federal legislation, letters in response to official and public inquiries, federally-required long-range air-quality plans, analysis of the effectiveness of the state's air-quality programs, and other technical and educational documents.

In addition to sediment management and air-quality experience, Ms. Eves has also worked as a regulatory affairs specialist for a pharmaceutical company where her responsibilities included maintaining company compliance with Food and Drug Administration (FDA) requirements via submission of annual and supplementary reports, analyzing the impact of federal guidance and rules, reviewing manufacturing and process changes, and analyzing customer production requests.

Selected Publications

Eves, M.F., and S.D. Perry. 2006. "Getting to Yes: Three keys to successful community involvement in remedial decisions." Presentation at the USEPA Community Involvement Conference, June, Milwaukee, Wisconsin.

Note: In addition, co-authored/edited several hundred technical reports, including remedial investigation reports, feasibility studies, human health and ecological risk assessments, remedial

action plans, construction design reports, project strategy documents, and supporting materials. Also have developed content for websites, print newsletters, and educational materials.

ARCADIS

Education
BS, Environmental Engineering, United States Military Academy, West Point, NY, 1992

Years of Experience
Total - 8
With ARCADIS - 8

Professional Registrations
Engineer In Training, MI, since 2004

Matthew M. Bowman

Senior Project Manager

Mr. Bowman has more than 8 years experience in all phases of construction management and field engineering services, including sediment removal and capping, wetland construction and enhancement, groundwater barrier wall construction, engineered cap construction, pit closures, groundwater and soil vapor extraction/treatment system construction and startup, manufactured gas plant remediation, seep collection systems, and underground storage tank (UST) removals. His responsibilities have included project management, construction management, cost estimating, constructability reviews, construction sequencing and planning, client and regulatory coordination, bid solicitation and procurement, construction quality assurance program development and implementation, remedial alternative development, subcontractor management, waste profile development, plan development (work plans, site security plans, construction monitoring plans, construction quality assurance plan development, environmental assessment reports, bid solicitation packages, operation and maintenance plans, and construction documentation reports), conducting public meetings, and obtaining permits (municipal construction permits, access agreements, DOT permits, Section 404 permits, soil erosion control and sedimentation permits). Mr. Bowman is located in ARCADIS' Brighton, Michigan office.

Project Experience

PCB Sediment Dredge and Removal Project
Confidential Client, Plainwell, Michigan
Project Manager for a sediment dredge and bank stabilization project for removal PCB-impacted soil and sediment from a 1.9-mile section of the Kalamazoo River. Remedial activities included removal and solidification of 130,000 cubic yards of PCB-containing sediments and soil, dam removal, water control structure construction, sheet pile cofferdam construction, turbidity control activities, water treatment, riparian wetland restoration, and transportation and disposal operations.

Installation of Groundwater Treatment System
Confidential Client, Michigan
Field oversight for the installation (~250 gpm) of a groundwater treatment system at a TCE-impacted manufacturing facility. Responsible for contractor engineering control, construction quality assurance, client liaison duties, project documentation, system startup, and component testing. Scope of work included installation of a 2,500-square-foot steel-frame building with concrete foundation; five-tray air stripper; plant compressed air system; multi-media filter vessels;

backwash system; groundwater-extraction pumps; control panel; and associated instrumentation, wiring, piping, excavation, directional boring, and concrete.

CKD Sediment Dredge and Removal Project

Confidential Client, Petoskey, Michigan

Project Manager for a sediment dredge and engineered cap placement project associated with CKD-impacted soil and sediment in a harbor adjacent to Lake Michigan. Remedial activities included removal and solidification of 1,000 cubic yards of CKD-containing sediments and soil, installation of 1.5 acre engineered sediment cap (comprised of geotextile, sand, geosynthetic clay liner, and armor stone), turbidity control activities, bank restoration, and transportation and disposal operations.

Groundwater Barrier Wall (Combination Slurry Wall/Jet Grout Wall) and Groundwater Extraction Trench Construction

Confidential Client, Bogalusa, Louisiana

Project manager for the construction of a groundwater barrier wall (a combination slurry wall/ jet grout wall) and a groundwater extraction trench (constructed using biopolymer slurry) at a combined paper mill and chemical plant. Project activities included utility relocations; installation of a 2,200-linear-foot 45-feet deep cement-granulated blast furnace slag jet grout barrier wall/bentonite slurry wall; installation of 25-foot deep groundwater extraction trench (using biopolymer slurry); groundwater extraction system installation (vaults, pumps, valves, electrical, instrumentation), traffic control operations; waste processing, transportation, and disposal operations; asphalt restoration.

Closure of Pits at Gas Plant

Confidential Client, Garden City, Louisiana

Project Manager for the closure of three wastewater pits at a gas plant. Construction activities consisted of access development, dewatering, excavation and processing of 10,000 cubic yards of waste material and soil, backfill of 15,000 cubic yards of fill, installation of permanent stormwater features, and site restoration.

Closure of Manufactured Gas Plant Site

Confidential Client, Morrison, Illinois

Project Manager for the closure of a manufactured gas plant site in a downtown lot in Morrison, Illinois. Construction activities consisted of access development, excavation, transportation and disposal of 2,200 cubic yards of waste material and soil, use and implementation of a shoring system for excavations up to 20 feet in depth, odor suppression activities, backfill and compaction of 2,200 cubic yards of fill, and site restoration. Construction methods employed for the project required particular sensitivity due to the downtown location of the Site.

Wetland Construction Project

Confidential Client, Bridge City, Texas

Project Manager for a 120-acre wetland construction project in Texas. Wetland construction activities included excavation and processing of 120,000 cubic yards of historical dredged spoils and dredging of 25,000 of existing sediments to create 85 acres of emergent estuarine wetlands and 35 acres of wet prairie coastal wetland. Project included mound construction, terrace construction, mudflat construction, and the establishing of wetland vegetation.

Corrective Action Management Unit (CAMU) Construction

US Army, California

Project manager for the construction of a 2-acre CAMU at a US Army Facility. The project included waste consolidation and conditioning activities, placement of 2-acres of geosynthetic clay layer, placement and compaction of an 18-inch clay layer, stone layer placement, and storm water control feature construction. Construction activities required appropriate methods and safety measures to be employed to address the potential of encountering unexploded ordinance (UXO) during construction.

Petroleum-Impacted Soil Remediation

Confidential Client, California

Project manager for remediation of petroleum-impacted soil at an oilfield site. Remedial activities included test pitting, excavation, and hauling of impacted material; screening through a power screen to reduce total petroleum hydrocarbon concentrations; loading impacted material for rejected material for disposal; backfilling and compaction; grading; and dust control. Construction area was located within a dense residential area of a beach community.

Closure of Cement Kiln Dust (CKD) Waste Pile and Construction of Jet Grout Barrier Wall

Holcim (US) Inc., Michigan

Project manager for the closure of a 37-acre historical CKD waste pile and construction of jet grout barrier wall at a cement manufacturing plant. Project activities included clearing and grubbing; base grading of 130,000 cubic yards of waste material (cement kiln dust) and soil; installation of base grading soil layer; installation of geosynthetics (1.4 million square feet of 40-mil LLDPE liner, 1.3 million square feet of cap drain geosynthetic drainage composite, and 300,000 square feet of underdrain geosynthetic drainage composite); installation of soil protection and vegetated soil layer (~120,000 cy); installation of anchor trench and passive seep collection systems; installation of a 1,200-linear-foot cement-bentonite jet grout barrier wall; site restoration; installation of permanent stormwater features; and access road construction.

Stormwater Management Systems Installation and Modification

Holcim (US), Inc., Oklahoma

Project manager for the installation and modification of storm water management systems at a cement manufacturing facility. Construction activities included the installation of 2,000 feet of

HDPE pipe; stormwater retention basin construction; submerged and centrifugal pump installation; and stormwater drainage modifications, outfall structure rehabilitation, and site restoration.

Creek and Habitat Enhancement Project

Holcim (US), Inc., Colorado

Project manager for a creek and habitat enhancement project at a cement manufacturing facility. Wetland habitat enhancement activities included installation of several stone riffles and back pools along a creek, planting of wetland species, and removal of wetland pest species as a part of mining reclamation activities.

Levee Design and Construction

Confidential Client and New NGC, Inc., Oklahoma

Lead designer and construction manager for the design and construction of a 9,000-foot levee to protect an industrial wastewater lagoon on federal lands. Responsibilities included development of plans and specifications, including details of an outfall structure, tie-in with existing dikes, cutoff trenches, erosion protection, and storm drainage. Construction included the excavation, hauling, and recompaction of approximately 130,000 cubic yards of clay, creation of 8 acres of wetland habitat, fence installation, access road construction, and site restoration. Additional activities included project/construction management, client coordination, developing cost estimates, bid solicitation, subcontractor management, assisting in the development of a construction work plan, developing an environmental assessment (to meet NEPA requirements), conducting a public meeting, preparing a Section 404 permit, and coordinating, negotiating, and corresponding with local, state, and federal agencies.

Petroleum-Impacted Site Closure

Confidential Client, California

Project manager for the closure of petroleum-impacted site. Construction activities included the removal of a surcharge layer (approximately 26,000 cy); base grading; installation of approximately 2-acres of geosynthetics (60-mil LLDPE liner and cap drain geosynthetic drainage composite, and a safety warning layer); installation of soil vapor collection (~3,000 cy of crushed stone) and soil protection (~11,000 cy of recompacted clay) layers; installation of an anchor trench and stormwater drainage systems; 900-square-foot masonry block and structural steel building with concrete foundation with asphalt driveway; installation of a soil vapor extraction and treatment system, including a blower, condensate sump and pump, condensate tank, activated carbon drums, control panels, cellular autodialer; and associated instrumentation, wiring, drilling, and piping. Obtained permits and met local requirements for hauling, grading, stockpiling, building construction, well construction, well destruction, and air emissions. Construction methods employed for the project required particular sensitivity due to the close proximity of residential housing. Project required close coordination with a developer constructing a city park over the cap and residential houses in the immediate vicinity of the project.

Underground Storage Tank (UST) Removals

Confidential Client, Michigan

Tasks included project management, supervising UST removal activities; site assessment and sampling; coordination with the client, laboratory, contractors, and the Michigan Department of Environmental Quality (MDEQ); determining and coordinating waste characterization and disposal; and authoring closure reports, assessment reports, registrations and documentation.

ARCADIS

Education
MS, Civil Engineering (Geotechnical Engineering), Syracuse University, Syracuse, NY, 1990
BS, Resource and Environmental Engineering, SUNY College of Environmental Science & Forestry, 1985

Years of Experience
Total - 23
With ARCADIS - 7

Professional Registrations
Professional Engineer, NY

Professional Qualifications
ASCE *Ground Modification* Seminar
ASCE Pipejacking and Microtunneling Seminar
ASCE Sheet Pile Design Course
Dale Carnegie Executive Training
Southeastern Transportation Geotechnical Engineering Conference

Professional Associations
American Society of Civil Engineers

Lance S. Ketcham, PE

Senior Engineer

Mr. Ketcham has 23 years of remedial investigation, feasibility study, remedial design, and construction management/ inspection experience. Duties have included preparing proposals, negotiating contracts, financial management, staffing and career guidance, project development, project management, and strategic planning.

Project Experience

CQA
Seneca Falls, New York
Served as project manager responsible for construction oversight and certification of an 18-acre double composite overfill liner landfill cell. Responsibilities included managing an onsite construction manager and three to four construction observers. Documented and troubleshot conflicts with the design and construction installation relative to the Part 360 regulations and the landfill operating permit. Coordinated with the owner's engineer, contractor, and regional regulators (NYSDEC).

Operation and Maintenance (O&M) of the Leachate Treatment Facility
Served as project manager at a closed Class 2 hazardous waste landfill under the New York State Superfund Standby Contract. Facility work included redesign and upgrade of the treatment facility and operation during a three-year period. Fieldwork included site inspections and groundwater sampling and analysis.

Remediation Project
Cumberland Bay
Project manager responsible for the Cumberland Bay PCB Remediation Project, an emergency New York State Superfund assignment, to study, plan, and develop contract documents for an underwater PCB sludge cleanup. Work elements included contract bidding, award, and construction oversight.

Remedial Design and Construction Administration
Northeastern New York
Served as project engineer for a landfill site located on a government nuclear training site. Interfaced with government representatives on construction progress and final construction certification.

Remedial Investigation/Feasibility Study/Remedial Design/ Construction Inspection (RI/FS/RD/CI)
Town of Van Buren, Central New York
Project manager for the Town of Van Buren Class 2 hazardous waste landfill. Responsibilities included preparing the RI, FS, RD, construction bid documents, bidding services, and engineering construction oversight. The FS investigated four viable alternatives including Part 360 and Part 373 cover systems, a slurry cut-off wall, waste consolidation, and incineration.

Construction Quality Assurance/Construction Quality Control (CQA/CQC)
Central New York
Served as project manager for the Part 360 landfill closure system at the Town of Clay Landfill. Oversaw on-call construction inspectors and laboratory personnel in the implementation of the CQA/CQC program.

Construction Quality Assurance/Construction Quality Control (CQA/CQC)
Fairport, New York
Served as project manager for the Waste Management High Acres Landfill, a Part 360 landfill cell closure system. Oversaw a full-time construction inspector and onsite laboratory personnel for the implementation of the CQA/CQC program.

Construction Quality Assurance/Construction Quality Control (CQA/CQC)
Central New York
Served as project manager for the Part 360 landfill closure system at the Yates County/Torrey Landfill. Oversaw on-call construction inspectors and laboratory personnel in the implementation of the CQA/CQC program.

RD/CI
Village of Tuxedo, Orange County, New York
Served as project manager for the Village of Tuxedo Class 2 Hazardous Waste Disposal Site. The RD and engineering construction oversight was completed under the New York State Superfund Program. The project involved developing innovative approaches to gas venting and site drainage systems. The work also involved extensive coordination with the village and the adjacent railroad agency (Conrail). Responsibilities included project design, scheduling, management, regulatory coordination (New York State Department of Environmental Conservation [NYSDEC]), and construction material evaluation. Project scope required preparing operating and maintenance, health and safety, and contingency plans, in addition to the construction bid documents.

Subsurface Investigation
Northumberland, New York
Served as project engineer responsible for onsite soils at the Finch Pryun/Scott Paper Sludge

Landfill to determine their feasibility as components in the proposed landfill liner system. The investigation included both in-situ and laboratory testing. After the soil's suitability was analyzed, the facility's liner system was designed. Engineering design also evaluated the landfill liner system for slope stability with natural soil and geosynthetic components.

Construction Inspection

Town of Wallkill, Ulster County, New York

Served as project manager for the Town of Wallkill Landfill, a hazardous waste landfill. Interesting components of the construction included challenging grading and revegetation of a stream/wetland running through the site. Developed a proposal to accept classified construction and demolition debris (C&D) to raise grades and create revenue to offset the closure expense. The plan required coordinating with regulatory personnel and developing a work plan to screen for waste contamination.

ARCADIS

Education
MS, Safety, University of Southern California, Los Angeles, CA, 1992
BA, Political Science, University of Colorado, Boulder, CO, 1982

Years of Experience
Total - 27
With ARCADIS - 6

Professional Registrations
Certified Safety Professional, since 2001

Professional Associations
American Society of Safety Engineers

Chuck P. Webster, CSP

Environment Division LPS and Compliance Assurance

Mr. Webster has more than 16 years of experience in environmental health and safety as well as another 11 years of experience working with the military. His responsibilities have included corporate health and safety management, contractor health and safety monitoring, conducting EHS training, and managing EHS functions for the contractor tasked with the World Trade Center debris removal.

Mr. Webster is currently the environment division Loss Prevention System and Compliance Assurance Manager, responsible for stewardship of the ARCADIS behavior-based safety program as well as validating safety practices via audits and site visits. Previously Mr. Webster served as the corporate health and safety manager responsible for stewardship of the ARCADIS health and safety program. He provided guidance and training for initial rollout of the Loss Prevention System (behavior-based safety) throughout ARCADIS. Mr. Webster also provides health and safety support directly to ten of our larger client teams.

Project Experience

Health and Safety Regulatory Assessment and Specification/Mercury Vapor Survey
Confidential Automotive Client, Warren, Michigan
Conducted site survey and determined health and safety requirements for utility cut and cap activities for preferred client in Michigan.

Kalamazoo River
Confidential Client
Prepared health and safety plan. Conducted LPS field assessment; delivered health and safety support to team via review of LPS tools and site visits/coaching.

8-HR HAZWOPER Training Certification
Confidential Automotive Client, Massena, New York
Prepared and delivered annual HAZWOPER refresher training for preferred client in Northern New York state.

AEC/ RADFORD
U.S. Army Environmental Center
Health and Safety team member in support of large investigation/remediation project. Reviewed

health and safety plan; conducted LPS field assessment and conducted ARCADIS compliance audit. Ongoing support to project.

Comprehensive Safety Survey
New York Compensation Managers, New York
2003
Conducted workers compensation loss control surveys for a myriad of companies in the NYC metropolitan area.

Comprehensive Safety Survey
Confidential Client, New York
2005, Project Cost: $73,365
Conducted comprehensive fixed ladder and crane safety survey. Validated all plant fixed ladders to OSHA/ANSI standards. Conducted inspections and load tests of plant overhead lifts.

Incident Response
Confidential Client, San Jose, California
Provided H&S support during incident response at major government contractor manufacturing facility. Prepared Health and Safety plans, job safety analysis and provided site safety guidance during initial months of response.

Environmental Health and Safety (EHS) Audit Package
Xerox, New York
Developed EHS audit package for multi-faceted manufacturing facility to include the following operations: paint, plating, injection molding, metal forming, machining, tool, and model shops. Comprehensive Safety Survey.

Safety Surveys
Great American Insurance Company, New York/Connecticut
Conducted comprehensive safety survey of heating oil distributors throughout New England.

Contractor Health and Safety Monitoring
Confidential Client, Rahway, New Jersey
Project manager responsible for contractor health and safety monitoring. Coordinated efforts of five EHS professionals. Conducted both contractor and customer training on EHS topics. Provided industrial hygiene support during a major brownfield construction project.

ARCADIS

Education
BS, Natural Resources, Northland College, Ashland, WI, 2000

Years of Experience
Total - 8
With ARCADIS - 8

E.J. Suardini

Senior Construction Resident II

Mr. Suardini has more than 8 years of experience in construction and field services. His background includes construction management, construction quality assurance (CQA), and site investigations primarily with earthwork projects, including landfill construction and closures.

Project Experience

Stauffer Management Cap
Lubbock, Texas
Assisted the project manager with project setup and subcontractor solicitation. Responsibilities included development of self performance personnel and equipment mix to complete the job, solicitation of multiple subcontractors, developing contracts and procurement of materials. Additional responsibilities included project correspondence and budget review.

Coalinga Closure
Confidential Client, Coalinga, California
Served as a site superintendent for an ARCADIS Construction & Environmental Services self-performance project. Responsibilities included managing a construction crew of approximately 10 employees, managing subcontractors, acting as the ARCADIS Construction & Environmental Services client and regulatory liaison. The scope of work included earthwork activities such as backfill and compaction of approximately 200,000 cubic yards of material, mass grading, stormwater control feature construction, and restoration. The project was completed on time and under budget. During the course of the project many field changes were implemented with the authorization of the certifying engineer to reduce the cost and schedule of the project.

Holmby Cap Construction
Confidential Client, Huntington Beach, California
Served as construction manager/construction oversight on a 2-acre environmental closure project located at a downtown site. Scope of work included the installation of multiple layers of geosynthetics as well as the construction of a gas vapor extraction remediation system. Coordinated multiple phases of construction concurrently to cut costs and to shorten the overall construction schedule. Responsibilities included subcontractor management, subcontractor bid and contract development, obtaining multiple construction permits, correspondence with client and city officials during construction activities, and acting as the site health and safety supervisor.

Closure of CKD Pile

Cemext, Michigan

Served as CQA observer for the closure of a 35-acre historical cement kiln dust pile. Responsible for all quality assurance sampling, testing, monitoring, and documentation pertaining to the project. Responsibilities also included client and agency communications throughout multiple phases of the project and working with the design team to manage field changes. Project components included the consolidation of multiple CKD piles into one large pile, base grading of CKD, installation 60 mil HDPE geomembrane and geocomposite drainage layer, installation of protective cover soils, construction of stormwater management features, and site restoration. Additional construction components included the neutralization and dewatering of a 1 million gallon temporary pond and the construction of a 600-linear-foot groundwater collection trench.

Multi-Phase Environmental Remediation and Landfill Closure Project

Confidential Client, Dundee, Michigan

Served as construction manager/construction oversight in a multi-phase environmental remediation and landfill closure project. Responsible for subcontractor management, construction quality assurance, client and agency liaison, and project documentation. Scope of work included subcontractor bid and contract development, and construction and stormwater permit applications. The scope of work included clearing and grubbing, base grading, installation of multiple geosynthetic layers, installation of protective cover soils, construction of stormwater management features, and restoration of a 33-acre historical landfill. Approximately 120,000 cubic yards of material was regraded and consolidated within the landfill, and approximately 130,000 cubic yards of fill material was relocated from an on-site borrow pit to complete the project. Additional regrading and consolidation was completed at an adjacent area to address slope stability issues and facilitate the creation of a wetland area.

Marsulex Impacted Waste Removal

Confidential Client, Michigan

Served as construction manager for the removal of approximately 50,000 cubic yards of impacted waste from an active industrial facility. The work included excavating, loading, transporting and disposing of all impacted soils. Responsibilities included subcontractor coordination, manifest tracking, coordination of field changes, coordination of field survey, post-excavation sample collection and project documentation.

Landfill Cell 4 Construction

Confidential Client, Michigan

Served as construction manager and construction quality assurance (CQA) observer for the construction of a 6-acre landfill cell at an industrial landfill. Responsible for all quality assurance sampling, testing, monitoring and documentation pertaining to the construction of a 6-acre industrial landfill cell and corresponding leachate management system components. Also served as the main client contact for the work and coordinated field changes with the design team.

Project components included geotextile and PVC geomembrane installation, recompacted clay undercuts and the installation of a leachate collection system. The project was completed on an expedited schedule, and received regulatory approval prior to the landfill running out of capacity.

Landfill Cell 2 Compacted Clay Cap Construction

Confidential Client, Michigan

Performed construction management and CQA tasks in the construction of a 4-acre landfill compacted clay cap at an active industrial landfill. Responsibilities included management of subcontractors, construction oversight, quality assurance observation, quality assurance testing and project documentation. Also acted as the main client contact for the work, coordinated with regulatory agencies and communicated with the design team to manage field changes.

Macon Creek - North Branch Hydraulic Dredging Project

Confidential Client, Michigan

Served as on-site construction manager for this hydraulic dredging project. Responsibilities included daily oversight of the dredging contractor, intermediate budgeting control, and client communications. In addition, was responsible for sediment probing and thickness measurement surveys for payment purposes and all on-site quality control and project documentation. The project scope consisted of the dredging of an industrial settling lake and an industrial reservoir connected to a Michigan waterway, constructing an environment earthen cap from dredged spoils, and constructing a temporary industrial water line. The dredge material was discharged to an on-site location where it was utilized to construct an artificial wetland area. Approximately 90,000 cubic yards of sediment/soils was dredged from the two areas.

Quarry Disposal Area Closure

Confidential Client, Dundee, Michigan

Served as construction manager and general site supervisor of a 50-acre environmental closure project. Responsibilities included subcontractor management, construction quality assurance, client and agency liaison, and serving as health and safety supervisor for the project. Developed alternative cost-saving solutions to field activities throughout the project. The scope of work included mass grading of the existing waste pile to the construction quality assurance specifications of the project and the construction of stormwater management features. Drafted weekly correspondence submittals including construction progress reports depicting construction activities for all project team members.

ARCADIS

Education
BS, Industrial Distribution & Engineering Management, Clarkson University, Potsdam, NY, 1986

Years of Experience
Total - 19
With ARCADIS - 9

Professional Associations
American Society for Quality
Sigma XI
USEPA Science Advisory Board

Robert Reed

Manager, Corporate Quality Assurance

Robert Reed is the Manager of Corporate Quality Assurance for ARCADIS. Mr. Reed has more than 19 years of professional experience as a quality and manufacturing leader responsible for the design, cost control, coordination, and administration of quality improvement and lean manufacturing efforts on industrial, governmental, and municipal projects. He continuously leads efforts to achieve client satisfaction, enhance business performance and develop world-class organizations by facilitating and promoting process improvement and lean-thinking principles. He has designed and implemented quality management systems and has conducted numerous internal audits at industrial, manufacturing and service industry locations in the United States. Mr. Reed has provided a range professional training for a broad spectrum of management-, manufacturing- and service-oriented customers.

Project Experience

QA/QC Manager
Currently serves as the QA/QC Manager for all project work related to a confidential client - Technical Assistance to the DEP in Implementing Environmental, Health and Safety Compliance Programs. Project activities and responsibilities include the development, review and approval of all work instructions (SOPs), field assessments and audits, review of written documents delivered to the client and monitoring of all project activities as they relate to client requirements and expectations.

QA Manager
Currently serves as the QA Manager for all project work related to confidential industrial client's 5,000 acre facility. Project activities and responsibilities include the development, review and approval of the Program Management Plan, field assessments and audits, and monitoring of all project documentation activities as they relate to client requirements and expectations.

Quality Management
Currently leads all quality management initiatives within ARCADIS and is responsible for developing and implementing quality assurance/quality control activities for our clients. Technical experience includes lean manufacturing, ISO9001 and 14001 management systems and auditing, leadership development, project management, and team building. Developed and presented training presentations on a variety of quality-related topics; has managed a number of product, service, and process improvement projects; and has developed and implemented comprehensive quality improvement programs for clients. Current responsibilities include:

- identifying, developing and implementing core processes used by ARCADIS to provide our clients with expected deliverables
- conducting internal audits on client- and project-specific activities performed by ARCADIS project staff
- developing and conducting quality assurance and continuous improvement training programs
- executing the planning, managing and performance of field audits for compliance with work plans, standard operating procedures, and quality assurance project plans (QAPPs)
- approving project and client quality plans

Project-Specific Activities

Involved with project-specific activities and has developed, implemented, and managed several field activity-based audits for technical work that ARCADIS performs for our clients. These experiences range from small, informal procedural audits to formal assessment and oversight auditing programs required by the United States Environmental Protection Agency (USEPA). Audit management program activities have included the development of an assessment program, training of auditors, development of audit checklists, performance as a Lead Auditor, initiation of corrective and preventive action, preparation of final audit reports, and performance of follow-up activities to verify and validate that corrective actions were taken and proven effective.

ISO 14001 and Greening the Environment (GEMS) Training and Consulting Program

Developed a client-driven ISO 14001 and Greening the Environment (GEMS) training and consulting program for use with a federal agency in New York State. This program has been designed to facilitate client understanding of the requirements of both ISO 14001 and GEMS and to provide the client with an implementation plan for achieving conformance with these requirements.

Leadership Coaching

In addition to providing technical support to client projects, continuously involved in providing project management and leadership coaching to project managers and principals-in-charge across the ARCADIS organization. Coaching activities include guiding project leaders in the principles of project management, sound project planning, effective project execution, progressive project assessment techniques and tools, and effective facilitation of project-related problem solving and improvement activities.

Accomplishments during tenure at ARCADIS include:

- development and implementation of 34 common processes (Quality Procedures) used throughout the organization
- successful creation of a Quality Management Plan that meets the needs of ARCADIS and its clients, and the requirements of the USEPA

- implementation of an electronic library used for the development and maintenance of technical standard operating procedures used for our clients
- creation of a quality procedure training program that has engaged 85% of ARCADIS staff, who have completed nearly 9,000 online training modules
- implementation of a self-assessment process utilized by multiple client, project, and proposal teams
- successful design and implementation of an internal quality website that provides all ARCADIS staff with the tools and guidance necessary to meet the expectations of our clients

Quality and Environmental Management System

Directed quality (ISO 9001) and environmental (ISO 14001) management systems for 900+ employee operations and managed the quality improvement system. Led organization and department quality improvement teams. Provided leadership for the planning and implementation of ISO 14001 efforts, leading to successful registration. Guided and trained executive staff in continuous improvement activities. Provided ISO 9001 and ISO 14001 Internal Auditor Training and led numerous internal environmental and quality-related management system audits for a cable and telephony manufacturer.

Internal Audit

Developed and provided 2-day internal auditing for ISO 9001 and ISO 14001 internal auditors. Training included case studies, role playing and audit techniques.

Quality Program

Developed quality program for 350+ employee distribution pharmacy. Led organizational approach toward quality-at-the-source and the elimination of multiple/non-value-added quality control checkpoints.

Quality Management System

Developed and implemented a quality management system for a 450+ employee firm (growing to 900+ within 5 years) based upon the ISO 9001 International Standard and the E-4 National Standard. System designed to accommodate standardization of multiple offices and technical disciplines throughout the firm.

Quality Assurance/Quality Control Review

Continually performs quality assurance/quality control review of ARCADIS work product and work processes, and conducts project audits. Serves as quality consultant to 200+ project managers, providing training, review, and problem- solving expertise to these internal customers, as well as identifying and addressing any corrective, preventive, or improvement-oriented action items for our client base.

Lean Manufacturing Simulation Workshop

Led the development and implementation of an 8-hour manufacturing/assembly workshop geared toward the lean manufacturing concepts of just-in-time, pull systems, kanban, quality at the source, and on, visual factory, load leveling, one-piece workflow, and the elimination of waste. Conducted more than 30 workshops for manufacturing sector (MAGNA Powertrain, Pall Trinity Micro, Goulds Pumps, Schneider Packaging, Lockheed Martin, Philips Electronics). Workshop included the effective use of financial, lead-time, queue time, inventory, and man-hour tracking.

Value Stream Mapping

Effectively utilized process technique across multiple industry sectors in the identification and improvement of key process and bottleneck issues related to specific needs of each customer and process. In manufacturing setting, efforts focused on critical path, waste, communication and responsibilities, documentation reduction, and inventory management. Formal process and training included current-state mapping, training in the tools and techniques of lean manufacturing, and the development of future-state maps. Conducted mapping of 100 processes, ranging from manufacturing- to service-related industries (e.g., Philips Electronics; Anoplate Corporation' Blasland, Bouck & Lee, Inc.; MAGNA Powertrain; Oberdorfer Industries; King & King Architects; Goulds Pumps).

Six Sigma

Led defect-reduction efforts on a number of electro-mechanical assembly lines for government contracted defense systems.

5S

Conducted more than 20 assembly-line 5S events for major gear manufacturer, identifying and effectively eliminating waste in a 3000+ three-shift unionized environment.

Lean Program Management

Led the combined efforts of multiple projects related to lean manufacturing and cycle time reduction for a plating facility. Combined projects included 5S, total preventive maintenance (TPM), quick set-up, team building/self-directed work teams, process mapping and reorganization of business structure.

Kaizen

Led multiple Kaizen events for an electronics manufacturer and an electro-plating facility.

Shop Floor/Assembly Layout

Conducted shop floor layout benchmarking activity for packaged concrete manufacturer and developed best practice layout of existing and future facilities. Major focus on waste elimination, reduction of repetitive motion, traffic and warehousing layout, safety and control mechanisms, and employee safety.

ARCADIS

Education
BS, Civil/Geotechnical Engineering, West Virginia University, Morgantown, WV, 1983

Years of Experience
Total - 28
With ARCADIS - 9

Professional Registrations
Professional Engineer, DE
Professional Engineer, NJ
Professional Engineer, PA
Professional Engineer, VA

Professional Associations
National Society of Professional Engineers (NSPE)
Pennsylvania Society of Professional Engineers
Deep Foundation Institute

Stephen R. Montagna, PE

Senior Engineer II

Mr. Montagna has more than 28 years of international and domestic professional experience providing geotechnical and environmental engineering services. He has performed both geotechnical and environmental project management and lead engineering services during feasibility study (FS) phase, design phase, and construction phase on numerous project sites ranging from heavy industrial facilities, water and sewer treatment plants, sludge lagoons, reinforced earth embankments, power plants, storage tank facilities, and landfills.

Project Experience

Vertical Barrier Design
Confidential Client, Rockland, Maine
The former MGP plant operation discharged various coal-tar waste streams to on-site holder and UST system in the past. The strategy was to develop a creative approach to minimizing the potential migration of free-phase materials toward an adjacent cove area in light of the excessive tidal conditions that existed. Provided project management and lead engineering efforts for this project due to background in barrier systems, interceptor trenches and construction.

As part of the remedial approach, developed an approach that utilized a permeable barrier system made up of an open-graded stone mixture that provided adequate retention time for DNAPL materials to be collected by gravity in collection system connected at the base of the 20 ft deep trench. Established position for the collection trench in concert with tidal reach so as to minimize the effect of the tide changes on performance of the trench. By eliminating the use of hydraulic containment, the costs for the corrective action were significantly lower.

Remedial Action Work Plan (RAWP)
National Grid, Hudson, New York
Served as the lead geotechnical engineer assigned to evaluate an existing remedial action work plan (RAWP) for a former manufactured gas plant (MGP) site and develop pre-design investigation program and provide engineering design of proposed supported excavation.

The remedy was approved by the New York State Department of Environmental Conservation (NYSDEC), and the detailed design was initiated. Provided geotechnical expertise relating to the embayment sediment removal action that required specific information on sealed sheet pile design, dewatering, removal of affected sediments and reestablishment of the appropriate stream

bed materials. Permitting issues included wetland disturbance, stream encroachment, waterfront development, and similar issues.

Remedial Action Selection

Confidential Client, Trenton, New Jersey

Analysis of soil data and records confirmed that the Brownfields site (a former industrial facility) had been a repository for fill from ceramic manufacturing and highway construction works. Demonstrated that historical fill was present in certain areas of the site, and that these areas should be treated differently in any clean-up strategy, in a manner consistent with the historical fill provisions under the Industrial Site Recovery Act (ISRA) and the Technical Requirements for Site Remediation. Proposed removal of only the exposed drums and relevant waste materials associated with the Respondents.

Prepared the Remedial Action Selection Report and the Remedial Action Work Plan (RAWP) for the proposed activities. The RAWP included design specifications and drawings, an erosion and sediment control plan, a health and safety plan (HASP), an operation and maintenance plan, and a classification exception area (CEA) application for impacted groundwater. Removal actions were proposed without post-excavation sampling due to the presence of historical fill material that would bias the test results.

The RAWP was approved by the New Jersey Department of Environmental Protection (NJDEP) in December 1998. Planning activities include wetland and stream encroachment permitting and the development of a wetland mitigation and restoration plan. Estimated costs for implementation of the final remedy represent significant savings (approximately $10 million) over the remedy initially required by the NJDEP.

Evaluation of Existing RAWP

New Jersey Natural Gas, Atlantic Highlands, New Jersey

For a former manufactured gas plant (MGP), served as the lead engineer assigned to evaluate an existing RAWP for the site. The originally proposed remedy included soil and sediment excavation to residential direct-contact guidance levels, followed by natural remediation of the groundwater. A pre-remediation delineation sampling plan was implemented to see to that the appropriate remedy would be applied at the site. Based on the results of the pre-remediation delineation sampling plan, it became apparent that an onsite residential cleanup for onsite soils would not be economically feasible or technically practicable.

Assisted in the preparation of a revised RAWP for the site that proposed sediment excavation from a large section of the adjacent stream and wetland area, vertical barrier walls and free-product collection and removal, and an asphalt cap over onsite areas to contain the residual tars. A groundwater recovery and treatment system was also subsequently proposed. Onsite soils will be treated by a combination of oxidation and biological treatment.

The conceptual remedy was approved by the NJDEP, and the detailed design and permit applications were required on an expedited basis. The stream sediment removal action required specific information on alternating stream flow, dewatering, removal of effected sediments and surrounding wetland soils, re-establishment of new wetland vegetation, and re-establishment of the appropriate stream bed materials. Permitting issues included wetland disturbance, stream encroachment, waterfront development, and similar issues. The remedy provided for newly developed areas adjacent to the stream and wetland that will ultimately be converted into useable land for the local community.

Inactive Wastewater Lagoon Closure

Pfister Chemical, Ridgefield, New Jersey

Provided project management during the completion a focused remedial investigation (FRI) and focused feasibility study (FFS), followed by a CEA application. In addition to the organic wastewater sludges, the investigation revealed buried wastes and buried drums within the lagoon area. Concluded that in-place containment of the lagoon sludges and wastes with a cap and vertical barrier wall would be the most protective and cost-effective remedy. The remedy saved the client an estimated $60 million over the NJDEP-recommended strategy.

Prepared a RAWP that included detailed design drawings and specifications for filling the lagoon, capping the low-strength sludges with a multi-layer cap, and construction of a vertical barrier wall around the 6-acre lagoon area. Supporting documents including a HASP, construction quality assurance plan, and operation and maintenance plan were also prepared to support the design. The specifications provided details and performance requirements for the construction of different vertical barrier types so as to provide the greatest flexibility and potential cost-savings during the bidding and construction process. The RAWP and design documents were approved with virtually no comments.

Supported the client with the bidding and contractor evaluation process, and provided design support and construction quality assurance oversight during the construction work. During construction of the barrier wall, large boulders were uncovered along one section of the wall, and developed a revised construction procedure that minimized costs and improved wall quality. Provided oversight the quality assurance testing of slurry mixes, soil-bentonite backfill, trench depth, clay compaction, and membrane liner placement and seaming. The project was completed, and a portion of the cap was covered with aggregate to provide for future storage use and equipment access.

Interim Remedial Measures (IRM)

Occidental Chemical, Belle, West Virginia

At a former chemical production facility, provided lead engineering on a detailed evaluation of various vertical barrier systems as part of the interim remedial measures (IRM) to be performed at

this former chemical production site in Region 3. Following a series of deep soil borings to characterize the fill and natural alluvial deposits, a variety of vertical barrier systems was evaluated ranging from a soil-bentonite mixture to a deep soil mixing (DSM) system. Aside from implementation and effectiveness, a detailed cost analysis was performed to further screen the alternatives. Significant cost realities were produced in an effort to help show the client the complexities that exist on this site and allow further review of total site remediation concepts.

In addition, directed the detailed strength, compressibility, permeability, and property index tests on a variety of contaminated natural materials from the alignment of the vertical barrier. In-situ materials were characterized to determine if these soils could be used as admixed materials in soil-bentonite slurry wall construction.

Prepared a design package that included detailed design drawings and specifications for construction of a vertical barrier wall along the northwestern boundary of the site. Supporting documents including a HASP, construction quality assurance plan, and erosion and sedimentation control plan were also prepared to support the design. The specifications provided details and performance requirements for the construction of different vertical barrier types so as to provide the greatest flexibility and potential cost-savings during the bidding and construction process.

RCRA Unit Closures

Confidential Client, New Castle County, Delaware

The plant operation, based on the mercury-cell process, discharged various wastestreams to onsite disposal units in the past. Under RCRA, USEPA Region 3 identified several permitted units that needed to be addressed in order for Occidental to obtain its permit. The plant has three RCRA units that required closure under the RCRA program overseen by the DNREC: a container storage pad, a storage tank, and a sludge disposal impoundment.

The impoundment closure involved "closure as a landfill" as the sludges were to remain in-place following closure operations. Provided the detailed design for the sludge stabilization, cap installation, stormwater and drainage controls, and security measures.

In addition, provided technical guidance during the oversight of the construction that included field density testing of the stabilized sludges and soil components of the cap system, detailed documentation of the contractor's progress, detailed assessment of the contractor's compliance with the plans and specifications, review of as-built drawings, and recommendations for progress payments. Following completion of the field activities, a detailed engineering closure report was completed and certified the unit as closed.

Remedial Engineering and Design Services

Confidential Client, South Wales, United Kingdom

At a manufacturing facility adjacent to Commuter Rail Line, following local approval, provided design information for construction of a slurry wall, multi-layer cap and interceptor trench, construction performance specification criteria, and construction quality assurance requirements for the implementation of the proposed remedy.

Provided project management and lead engineering on a total encapsulation project in the United Kingdom. Managed cap, slurry wall, interceptor trench, and groundwater treatment project from development of the field program and conceptual design through the project design and construction phase. Worked directly with the U.K. engineering team so that design standards confirmed to British standards. In addition, provided ongoing consultation during the construction phase of the project including a field representative to document work performance for the owner.

Landfill Construction

Rehm-Grinaker, Port Louis, Mauritius

Provided a key leadership role (construction engineering) in the oversight of the 20,000-gpd landfill leachate treatment system to be constructed. Construction services included leachate collection system, leachate and landfill gas generation, leachate treatment systems, stormwater control, and management planning. Additionally, provided assistance with cost management and evaluation of design plans. Work in-country was essential in the procurement of proper services for completion of the works.

Selected Publications

Montagna, S. 1998. Permeable wall vertical barrier systems. In Proceedings from International Conference on Site Remediation. Kuala Lupur, Malaysia.

Contributing Author on Chapters covering Soil/Sludge Stabilization, In-place Containment/Vertical Barriers, and Geotechnical Engineering in University Textbooks, Hazardous Waste Management, LaGrega/Buckingham/Evans, 1994.

Houser, T. and Montagna, S. Redevelopment of solid waste landfills using waste materials and recyclables. In Proceedings from the Eighteenth International Conference on Solid Waste Technology and Management. Philadelphia, Pennsylvania.

ARCADIS

Education
BS, Geology, Northeastern University, Boston, Massachusetts, 1985

Years of Experience
Total - 19
With ARCADIS - 19

Professional Associations
American Society of Civil Engineers (ASCE)

Philip H. Batten

Senior Civil Design Manager

Mr. Batten has more than 19 years of experience in earthwork and stormwater engineering including design, permitting, and construction for solid and hazardous waste containment facilities; industrial landfill and impoundment closures; and stormwater management and erosion control facilities.

Project Experience

Conceptual Closure Design Evaluations
A-Site and Willow Boulevard Landfills, Kalamazoo, Michigan
Prepared multiple, conceptual closure grading designs for evaluation of fill volume conditions and configuration options. The evaluations considered material consolidation from surrounding areas, stormwater drainage, settlement, river revetment, final cover systems and future use and access.

Evaluation and Design for Closure of Multiple Lagoons
Allied Paper, Inc. Site, Kalamazoo, Michigan
Developed conceptual closure grading options for evaluation of fill volumes in consideration of settlement conditions, stormwater drainage and constructability. Prepared final closure design based on selected grading option which involved preparation of a comprehensive Engineering Design Report. The design report included construction-level drawings, calculations, technical specifications and design narrative. A unique aspect of the project included design of a stormwater detention basin over a portion of the site final cover system. The basin design included a double liner and landfill gas management layer.

Design of a Lagoon Closure
King Highway landfill, Kalamazoo, Michigan
Prepared closure design for a lagoon located along the bank of the Kalamazoo River. The design involved development of technical drawings, specifications and Engineering Design report. The design required assessment of future settlement conditions, evaluation and design for stormwater management facilities and consideration of constructability challenges.

Final Grading and Stormwater Management Design for a Former Landfill
12th Street Landfill, Kalamazoo, Michigan
Designed final closure grading for a former industrial landfill. The design involved a determination final grading conditions allowing for consolidation of outlying materials, limited regarding of existing landfill materials to achieve appropriate slopes and minimizing potential grading

infringement on adjacent properties. The design also included two drainage basins providing detention and sedimentation control for landfill related runoff prior to release to adjacent wetland areas.

Design of Equipment Maintenance and Weigh Scale Facilities (23759)

Confidential Client, Inc.,New York

Design included preparing technical drawings for construction of a 6,000-square-foot maintenance facility with adjoining employee services building and a covered petroleum tank farm at a major solid waste landfill. Also included were truck traffic routes, underground utility locations, and stormwater management facilities. Project was fast-tracked through the permit approval process, allowing for removal of existing maintenance and weigh-scale facilities from an area designated for landfill cell construction.

Development of Conceptual Final Grading Scenarios Associated with Final Cover Design

Amtech, New York

Developed conceptual grading schemes in conformance with New York State landfill regulations at a 15-acre construction and demolition debris facility. Used grading configurations and airspace estimates for each scenario to evaluate possible continued operation of the disposal facility, as well as closure costs and potential environmental impacts.

Project Coordination and Design of Vertical Expansion and Final Cover System

Mid-American Waste Systems, Ohio

At an 80-acre municipal solid waste landfill, key design issues included determining current in-place solid waste volume, designing maximum remaining permitted air space, and analyzing existing onsite/offsite stormwater drainage conditions. Final cover design provided for tie-in to an existing soil final cover system with a proposed composite (soil/synthetic) final cover system. Stormwater management features included modifying two existing stormwater sedimentation basins and designing a third 14-acre-foot sedimentation basin.

Design of Remedial Hazardous Waste Landfill Facilities

American Cyanamid, New Jersey

Prepared facility designs in accordance with RCRA design requirements and included remediated material generation and fill placement analysis, and prepared conceptual plans showing site development phases. Multiple design concepts based on present and projected future landfilling needs provided the client with several development options. Chosen final design provided for optional vertical and horizontal expansions in addition to operational versatility for stormwater management and accessibility.

Design of Remedial Hazardous Waste Landfill Facilities

Cytec, Ohio

Prepared facility designs in accordance with RCRA design requirements and included remediated material generation and fill placement analysis, and prepared conceptual plans showing site development phases. Multiple design concepts based on present and projected future landfilling needs provided the client with several development options. Chosen final design provided for optional vertical and horizontal expansions in addition to operational versatility for stormwater management and accessibility.

Project Observation, Construction of Final Cover for Solid Waste Disposal Facility

Confidential Client, Inc., New York

Project included the construction of a geosynthetic-reinforced access road. Supervised on-site soil sampling and geotechnical testing. Evaluated and designed stormwater drainage systems based on unique on-site conditions encountered during construction. Prepared construction progress reports and final project construction certification report.

Closure Designs

Confidential Client, LLC, New York

Design goals for seven industrial waste impoundments associated with a hazardous waste disposal facility included developing flexible grading configurations allowing for variable in-situ stabilization processes, constructing low-maintenance stormwater management controls, and limited use of imported fill materials to achieve minimum-grade requirements.

Investigation of Design Alternatives and Preparation of Contract Documents, Drawings, and Specifications

Gulf Oil, New York

Responsible for investigating design alternatives and for preparing contract documents, drawings, and specifications for secondary containment systems for several petroleum bulk storage facilities. Evaluated secondary containment capacities for compliance with applicable codes and regulations. Designed stormwater collection and treatment systems, including preparation of State Pollutant Discharge Elimination System (SPDES) permit applications. Secondary containment design incorporated location-specific leak detection systems for 10 underground product pipelines located beneath a major commercial travel route.

Technical Oversight, Evaluation and Design of Stormwater Management Plan

Town of Cicero, New York

At this proposed community recreation/education complex, undeveloped site area encompassed more than 110 acres and included several ponds, wetland areas and stormwater control features. Preparation of the stormwater management plan required evaluating seven watershed areas totaling more than 145 acres under pre- and post-development conditions. Stormwater controls

were designed to minimize impacts to existing pond and wetland areas, as well as to accommodate staged site development.

Construction-Level Designs for Landfill Liner System Expansion

Confidential Client, Inc., New York

Key aspects of the design included tie-in of new perimeter berm, liner, and leachate collection system with existing operating landfill components; stormwater controls for intercepted drainage associated with the existing landfill cap; and relocation of an existing stormwater detention basin to allow for landfill expansion. Expansion design also required modification of the existing active landfill gas-collection system and site access roads.

Earthwork and Surface-Water Management Designs

Mid-American Waste Systems, Ohio

At two permitted 130-acre solid waste disposal facilities, prepared several conceptual facility designs consisting of excavation, liner, and final cover grading; site access roads; drainage controls; and airspace estimates. Prepared permit to install (PTI), which included designing excavation limits based on unique geotechnical conditions; composite soil/synthetic liner and final cover systems; leachate collection, transfer, and storage facilities; surface-water management system; and site phasing (waste fill progression and facility infrastructure development). PTI design also included preparing a comprehensive pre- and post-watershed analysis, phased soil balance and airspace calculations, and projected site life estimate. Stormwater management designs included using up to four sedimentation basins per facility, ranging in size from 10- to 15-acre-feet per basin.

Design Management of 4-Million Cubic Yard Expansion

Confidential Client, New York

Project involved preparation of nearly 40 construction-level permit design drawings, supporting calculations and technical specifications at a hazardous waste landfill facility. Key aspects of the design included a detailed evaluation of subsurface soil and groundwater conditions for the purpose of maximizing landfill airspace; design of a mechanically stabilized soil wall as part of the landfill perimeter berm system; complete on-site capture and containment of site stormwater runoff requiring an extensive analysis of the sites multiple stormwater basins and conveyance features; and accommodation of existing site facilities (landfills, buildings, storage tanks and utilities). Other important aspects of the project included participation in agency meetings and public information forums.

Design of Leachate Collection System

BFI, New York

Prepared subsurface geologic and hydrogeologic profiles at a solid waste disposal facility. Assisted in evaluating and designing a soil and geocomposite groundwater cutoff wall placed to

an average depth of 10 feet. Developed secondary containment and leak detection system for leachate disposal vehicle loading area.

Technical Support Activities

United Waste Systems, Ohio

Provided support in determining soil quantities available from permitted on-site surface mining areas at an 80-acre solid waste landfill disposal facility. Project work included designing interim and final grades within mining areas, evaluating available soil quantities based on proposed grading configurations, assessing pre-existing and post-development stormwater conditions, designing erosion and sedimentation controls and stormwater management systems, and designing permanent site access and interim haul roads.

Design, Permitting, Construction Oversight, and Certification

Confidential Client, New York

At this 5-acre compensatory floodwater storage area associated with major hazardous waste disposal facility, the additional flood storage volume was determined for the 100-year event based on evaluation of existing and proposed site conditions using HEC-2 water-surface modeling software. Conditions impacting floodwater storage included ongoing and future landfill development and temporary soil stockpiling.

Technical Oversight, Evaluation of Stormwater Management Conditions

Confidential Client, New York

At this 640-acre site associated with major hazardous waste disposal facility, the evaluation required compiling numerous as-built and newly acquired field surveys to reflect current site topographic conditions. The purpose of the evaluation was to delineate site watershed areas and determine the volume of runoff draining to various site stormwater retention basins. Results of the evaluation were used to determine the need for adjustments to basin storage capacities and re-configuration of select drainage patterns. The evaluation work culminated in developing construction-level designs and contract documents for modification of the retention basins and site drainage features. Ultimately, the completed work will be documented by field survey and submitted to the New York State Department of Environmental Conservation.

Design of Final Closure Grades, Stormwater Management Facilities, and Leachate Collection System

Confidential Client, Michigan

Developed final grades that included preparing three alternative grading configurations used to evaluate potential final subgrade fill conditions at a closed 30-acre Type II municipal landfill. Selected grading scheme required nearly 500,000 cubic yards of soil fill to meet the proposed subgrade configuration (design goal was to use available onsite and offsite surplus soil fill material as subgrade fill). Other highlights includede design of an 8,500-linear-foot gravity and force main leachate collection system and a 2.5-acre stormwater detention/wetland basin.

Design, Technical Specification, and Construction Oversight, Remediation/Construction of Stormwater Management Area

Confidential Client, New York

The project included regrading more than 8 acres of former industrial land. Proposed grading was designed to contain site runoff within the 8-acre area, thereby minimizing the potential offsite migration of soil sediments. Other project highlights included paving a snow storage area, installing new storm sewer system components, and cleaning more than 1,500 feet of storm sewer piping.

Final Closure Design

Town of North Hempstead, Long Island, New York

The final closure design at this Superfund site municipal/industrial waste landfill included using geosynthetic slope reinforcement on select areas of the final cover and on the primary landfill access road. Major design considerations involved limited regrading of existing waste materials, accommodating an existing abovegrade active landfill gas collection system, and siting an off-site sedimentation/ infiltration basin.

Volumetric Analysis of Contaminated Sediments

Confidential Client, New York

Using analytical sample data, earthwork modeling software was used to generate three-dimensional surfaces representing levels of contaminant concentrations present within the river sediments within a 7-mile-long section of river classified as a Superfund site. From established cleanup action levels, the generated contaminant surfaces were used to define the vertical and horizontal limits of impacted sediments. The data were then used to calculate the volume of sediment requiring remediation and to determine removal strategies.

ARCADIS

Education
BS, Geology, Southampton College of Long Island University,Southampton, N, 1984

Years of Experience
Total - 23
With ARCADIS - 23

Professional Registrations
Professional Geologist, PA

Professional Associations
Association of Ground Water Scientists and Engineers (AGWSE)
National Ground Water Association (NGWA)

Lisa R. Coffey, PG

Senior Geologist II/Associate

Ms. Coffey has more than 23 years of experience contributing technical and project management expertise to numerous environmental investigative efforts. Her background includes extensive experience designing site investigation programs, managing the collection of field data, and evaluating the resulting hydrogeologic and analytical data. Areas of expertise include the evaluation of the role of colloid transport in the migration of PCBs and inorganics in groundwater, and development of alternative sampling methods.

Project Experience

Remedial Investigation Report
Central Michigan
Prepared for an 8-acre landfill. Field activities included installation and sampling of a series of monitoring well clusters, surface soil sampling, and surface water sampling. An offsite property is currently being evaluated as a likely contributing source of the volatile organic compounds (VOCs) observed in groundwater.

Investigations and Phase I Reports
Western New York
For 12 orphan sites, completed investigations and prepared Phase I reports for the NYSDEC, generated hazard ranking scores, and formulated recommendations for future remedial work.

Facility Investigation
Karst Terrain, South-Central Pennsylvania
Served as project manager for a pesticide handling facility. Collected soil, surface water, and groundwater samples; installed a groundwater recovery well; performed pump testing and dye tracer testing to predict recovery well performance; and negotiated with the PADEP to allow seasonal land application of treated effluent containing residual nitrate concentrations exceeding the MCL of 10 mg/L.

Site Assessment
Syracuse, New York
Completed for a commercial property using gas chromatography (GC) as an initial screening tool to sample soil gas. The data suggested the presence of petroleum products, later verified by groundwater sampling in the identified area.

Field Program for Metal Plating Facility

Rochester, New York

Supervised the implementation to investigate chromium contamination in soils and groundwater.

Investigate Landfill

Bay City, Michigan

Evaluated various mixing zone scenarios for the discharge of metals in groundwater from the landfill to an adjacent river, to determine the need for remedial actions.

Investigation and Remedial Program

Central Pennsylvania

Served as project manager for a Agricultural Chemical Handling Facility. Atrazine, alachlor, cyanazine, metolachlor, and nitrates were observed at an onsite well at concentrations exceeding federal maximum contaminant levels (MCLs) and Pennsylvania drinking-water criteria. Due to the presence of karstic carbonate bedrock at shallow depths and a sinkhole adjacent to the facility, downgradient springs were identified and sampled to demonstrate the localized nature of the observed pesticide and nitrate compounds. Additional monitoring wells were installed onsite and sampled, and a series of soil samples were collected to identify potential source areas. An onsite groundwater recovery and treatment system was installed, and an ongoing monitoring program was negotiated with the Pennsylvania Department of Environmental Protection (PADEP).

Hydrogeologic Investigation

Flint, Michigan

Served as task manager for a 452-Acre Automotive Manufacturing Facility under the U.S. Environmental Protection Agency (USEPA) Resource Conservation and Recovery Act (RCRA) program. Project responsibilities included design of a field sampling program, oversight of data collection, presentation and interpretation of site analytical and physical characterization data, and negotiation with the USEPA regarding additional site response activities.

RI/FS

Tonawanda, New York

Served as hydrogeology task manager for a Superfund Site. Activities included literature review and research, generating geologic structure maps, supervising drilling operations, and analyzing contaminant migration trends.

Remedial Investigation/Feasibility Study (RI/FS)

Confidential Client, Saginaw, Michigan

As project manager, negotiated, developed, and implemented a remedial investigation/feasibility study (RI/FS) work plan prepared pursuant to a consent judgment. The RI/FS is being completed for the 250-plus-acre site to comply with Part 201 of the Natural Resources and Environmental Protection Act (NREPA) with Michigan Department of Environmental Quality (MDEQ) oversight.

Site activities have included completion of geophysical surveys; sampling soil, surface water, groundwater, and sediment; performing ecological and human health risk assessments (HHRAs); and completing the FS evaluation process to select appropriate remedial actions. The FS is currently being reviewed by the MDEQ.

Groundwater Monitoring

Confidential Client, Niagara Falls, New York

Characterized the extent of specific compounds in the groundwater at a regulated hazardous waste TSDF. Used an extensive historical database of groundwater quality data to effectively present data for the 300-plus-acre facility.

Groundwater Monitoring

Batavia, New York

Obtained a no further action determination from the New York State Department of Environmental Conservation (NYSDEC) for a former underground storage tank (UST) located at a utility company service center. Gasoline constituents had been identified in groundwater at concentrations above MCLs, and a soil vapor extraction system was operated at the site for an approximately 3-year period to reduce source soil concentrations. Groundwater monitoring data was used to demonstrate plume stability and then reduction.

Magnetometer Survey

Confidential Client, Saluda, North Carolina

Completed at a former service station to locate buried gasoline storage tanks, guide tank removal, and target investigation efforts.

Hydraulic Connection Study

Task manager for a hydraulic connection study at three hazardous waste landfills. Completed a hydraulic evaluation using leachate level and volume measurements, groundwater data, landfill construction records, and precipitation data. As a result of the evaluation, one landfill was recapped to limit excessive infiltration.

Fuel Oil Recovery Plan

At a spill location, devised a pumping schedule and plan to maximize the effect of a group of existing product recovery wells that had exhibited a dramatic decrease in efficiency.

Fuel Oil Recovery Plans

Confidential Client, Toms River, New Jersey

Developed for six spill locations. Completed step drawdown pump testing at each of the spill locations that resulted from the failure of a home heating oil distribution system.

Soil-Gas Survey

Victor, New York

Used at solvent disposal site to monitor for the presence of TCE. The survey was used as a cost-effective indicator of the subsurface distribution of TCE, and allowed for a reduction in the number of monitoring wells installed.

Field Study

Saginaw, Michigan

Designed and implemented to investigate the relationship between sampling methods used to collect groundwater samples, sample turbidity, and the observed concentration of PCBs. The study resulted in a revised groundwater sampling methodology.

Delineate the Subsurface Limits

Browning Ferris Industries, Niagara Falls, New York

Used boring and electromagnetic survey data to delineate the subsurface limits of land filled sewage sludge. The electromagnetic data were used to prepare volume estimates, and the sewage sludge was excavated and placed within an engineered landfill unit.

Implementation of a Soil and Groundwater Sampling Program

Hackensack, New Jersey

Designed and supervised program in support of a petroleum products company facing litigation from the current owner of a property, previously owned by the petroleum products company. By evaluating the collected analytical data, groundwater evaluation data, and underground utility location information, a potential upgradient source of the observed contamination was identified. Negotiations are ongoing regarding the need for an additional site investigation.

Study at Rural Aquifer

Central New York

Hydrogeology task manager for a study completed to characterize the distribution of chloride contamination. Evaluated the relative impacts of road salt application and point source contribution from a Department of Public Works storage area. Presented the data and possible abatement measures to the affected public.

RCRA Facility Investigation

Confidential Client

Served as task manager for a Treatment, Storage, and Disposal Facility (TSDF) containing more than 40 individual solid waste management units (SWMUs). Coordinated subsequent corrective measures study (CMS) development. An evaluation of contaminant trends and hydraulic data, in coordination with the completion of a risk assessment, resulted in the installation of a multiple-well-point groundwater recovery system, and implementation of a perimeter groundwater monitoring program.

Technical Support

As project manager, provided technical support for a Michigan client faced with litigation by the Michigan Attorney General (MAG) and the Michigan Department of Natural Resources (MDNR) under Act 307. Assisted with the successful negotiation of a significantly lowered assessment of past response activity costs. Evaluation and presentation of existing environmental data collected by the MDNR ultimately led to dismissal of the case.

Analyze Soil-Gas Samples

Central Hudson Gas & Electric

Several Coal Tar Facilities Operated a portable photoionization GC at several coal tar facilities. Analytical results were used to effectively place monitoring wells and eliminate unnecessary installations.

ARCADIS

Education
MS, Chemical Engineering, Syracuse University, Syracuse, NY, 2004
BS, Chemical Engineering, Syracuse University, Syracuse, NY, 2002

Years of Experience
Total - 6
With ARCADIS - 5

Professional Registrations
Engineer In Training, NY, since 2004

Professional Associations
American Society of Civil Engineers (ASCE)

Eric Dievendorf

Staff Environmental Engineer-in-Training

Mr. Dievendorf has more than five years of experience with ARCADIS, providing engineering and environmental management services to large industrial clients, specializing in remedial design, remedial construction, and cost estimation. He also has significant experience in stream channel stabilization and erosion control methods.

Project Experience

Remedial Design and Construction
Confidential Client, New York
Remedial design and construction for a creek and adjoining pond/marsh areas with PCB impacts. Activities included preparation of design drawings, text, and specifications; preparation of the bid package and addenda; participation in pre-construction and weekly progress meetings; and coordination with the contractor.

Remedial Design and Cost Estimation
Confidential Client, New York
Remedial design and cost estimation for a former MGP facility on a major river in New York State. Activities included preparation of design drawings and cost estimates; coordination of other design team members; review of text and specifications; and preparation of the bid package.

Cost Estimation
Confidential Client, Massachusetts
Corrective Measures Study for a river with PCB impacts. Activities included preparation of cost estimates for over twenty alternatives. Alternatives included mechanical sediment removal (wet and dry), hydraulic sediment removal, dewatering (blending, pressing), water treatment, upland soil removal, onsite disposal facility construction, and thermal desorption.

Site Characterization
Confidential Client, Eastern United States
Site investigation and characterization for a major river after an ash release. Activities included statistical analysis of data, preparation of report text, and coordination with the client.

Remedial Design, Construction, and Redevelopment

Confidential Client, Alabama

Interim Remedial Measures design and construction for a 170-acre former industrial site with coal tar impacts. Activities included preparation of design drawings; coordination with the contractor; budget and schedule tracking; preparation of Final Documentation Report and Record Drawings; and coordination with and review of information from redevelopment contractor.

Remedial Design and Construction

Confidential Client, Alabama

Remedial design and construction for one mile of creek with coal tar impacts. Activities included preparation of design drawings and text; coordination with the contractor; short-term construction oversight; oversight of subcontractor for bridge cleaning activities; and preparation of Final Documentation Report and Record Drawings.

Remedial Design

Confidential Client, New Mexico

Remedial design for nine miles of creek with metals impacts. Activities included preparation of design drawings, text, and specifications; sampling activities; and coordination with the client.

Cost Estimation

Confidential Client, Florida

Feasibility Study for a pond with PCB impacts. Activities included preparation of cost estimates for mechanical removal (wet and dry), hydraulic removal, capping, and hybrid options.

Cost Estimation

PRP Group, Ohio

Feasibility Study for a landfill potentially leaching metals to a neighboring river. Activities included preparation of cost estimates for soil removal, slope stabilization, reactive barrier wall, and pump and treat alternatives.

Selected Publications

Dievendorf, Eric. 2004. "Acoustic Monitor for Real-Time Analysis of Solids Concentration in Solid-Gas-Liquid Slurry." Master's Thesis. Syracuse University.

Presentations

"Measurement of Solids Concentration in the Presence of Bubbles Using Acoustic Monitoring Techniques." Presented at: AIChE Annual Meeting, November 17, 2003, San Francisco, CA;

American Chemical Society National Meeting, September 10, 2003. New York, NY; North American Mixing Forum Mixing XIX, June 19, 2003, Lake Placid, NY.

ARCADIS

Education
MS, Environmental Engineering, SUNY at Buffalo, Buffalo, NY, 1998
BS, Biology with Environmental Science minor, SUNY at Buffalo State College, Buffalo, NY, 1995

Years of Experience
Total - 13
With ARCADIS – 1.5

Matthew J. Biondolillo

Senior Project Manager

Mr. Biondolillo has more than 13 years of experience providing engineering services to large federal and industrial clients, specializing in remedial investigations, feasibility studies, remedial designs, and remedial actions at hazardous waste sites under RCRA and CERCLA guidance. He has specialized experience with sediment remediation and the restoration of aquatic environs. His responsibilities include project management, sediment remediation and habitat restoration design, cost estimation, field data collection and evaluation, construction oversight, and technical report preparation.

Project Experience

Remedial Design
Confidential Client, Ontario, Canada
Lead Design Engineer for the design of a sediment removal and restoration project in collaboration with a remedial construction contractor that had been separately retained by the client. The remedial design was used by the contactor for planning and implementation of the project and was also used to support acquisition of the many permits and approvals that were required before construction could begin. The primary design elements of the project included sediment excavation "in-the-dry" using a pumped bypass system:, sediment dewatering and conditioning at an upland staging area, on-site water treatment and restoration of the creek banks and bed with materials that were both stable under high flow conditions and suitable for aquatic and terrestrial organisms. The hydraulic characteristics of the creek system made for a complex by-pass pump design as there were several sources of water to the excavation area that all needed to be controlled including two separate branches of the creek and process and non-process discharges from the client's facility.

Remedial Investigation/Feasibility Study
Con Edison, Queens, New York
Project manager for a remedial investigation and feasibility study in connection with impacted sediments in Flushing River, Queens, New York. The project included preparation of a Records Search Report and Remedial Investigation/Feasibility Study Work Plan consistent with the requirements specified in the Consent Order. Remedial investigation activities are scheduled to commence in spring 2009.

Remedial Design

Confidential Client, Illinois

Project engineer for a confidential sediment site in USEPA Region 5. The selected remedial design includes removal in the "dry" using a combination of sheetpile and pump bypass systems, overburden and contaminated material segregation, and riparian and floodplain restoration.

Onondaga Lake Program

Honeywell, Syracuse, New York

Project Manager for the preparation of a Habitat Restoration Plan for the Onondaga Lake Bottom Site. The Plan presented habitat restoration and enhancement designs to be integrated into the Onondaga Lake Bottom remedy and with interim remedial measures and remedies for adjacent upland sites.

Project manager for the assessment of a Wetlands/Floodplain Assessment for Onondaga Lake. The project included a field reconnaissance, wetland boundary delineation, wetland function and value assessment, and ecological survey at four primary wetland complexes situated along the lake shoreline.

Project engineer involved with the preparation of a feasibility study for the Onondaga Lake Bottom Site. The study involved the evaluation of several remedial alternatives involving onsite containment, sediment removal and residuals management, sediment capping, natural recovery, and aquatic habitat restoration.

Project engineer for remedial design tasks at an upland site associated with the Onondaga Lake Bottom Site. Responsibilities included the preparation of plans and specifications for agency approval and construction bidding. The remedial design included the excavation and onsite consolidation of mercury-contaminated sediment from wetlands; excavation and onsite treatment of mercury source materials; excavation and onsite consolidation of brine mud; excavation and offsite disposal of PCB-contaminated soils; a 3,800 LF cutoff wall to 55 feet deep, groundwater extraction wells, an 18.5-acre multi-media landfill cap; sewer closure; and wetland restoration.

Project engineer and site supervisor for an extensive and complex pre-design investigation associated with the remediation of Onondaga Lake. The multi-year field program included 6 teams on barges and onshore processing of environmental media (soil, sediment, surface water, porewater, NAPL) samples. Responsibilities included coordinating field staff and subcontractors, communications with the regulatory agencies, and writing and reviewing sections of the work plan and subsequent data summary report.

Watershed-Scale Habitat Restoration

United States Corps of Engineers, Onondaga County, New York

Project manager for the development of a Comprehensive Habitat Restoration Plan for the Onondaga Lake Watershed. The project included the evaluation of current habitat conditions within the watershed including Onondaga Lake, its tributaries, and surrounding upland areas. The evaluation included assessment of existing habitat types and conditions; nature and extent of habitat disturbances; and alternative strategies to revitalize impaired habitats.

Remedial Investigation and Design

Atlantic Richfield Company, Wellsville, New York

Project manager/engineer for remedial investigation and pre-design investigation tasks at a Superfund site (former refinery facility). The project included an investigation of non-aqueous phase liquids (NAPLs) and dissolved contaminants which impact a Class A river and wetland. The project included the development of site investigation work plans, contractor procurement and scheduling, performance of field work to include the execution of borings, test pits, environmental media (soil, sediment, surface water, groundwater, and air) sampling, sample screening for presence of NAPL, wetland delineation, ecological survey, waste disposal, and preparation of reports. The remedial design included sediment remediation and subsequent river and wetland restoration, cut-off wall, groundwater recovery system, and constructed treatment wetlands.

Pre-Design and Design Activities

Confidential Client, Sidney, New York

Project engineer for the development and execution of pre-design and design activities at a Superfund site. The project included the design and installation of a sediment trap/weir system; development of remedial investigation plans, sampling of soil, surface water, sediment, and biota; and design of on-site TSCA landfill and landfill cap. Additionally, the design included the development of a Wetland/Floodplain Restoration Plan for the restoration of the 8.2 acres wetland system to be disturbed by remedial activities.

Remedial Design and Remedial Action Oversight

Confidential Client, Massena, New York

Project engineer for the remedial design and remedial action oversight at a Superfund site near Malone, NY. This is a PRP-led remediation that included a pre-design investigation of soil and sediment, bench-scale and pilot-scale solidification/stabilization, bench-scale groundwater treatability, design of a consolidation/ capping remedy, design for sediment removal, and oversight of the remedial action. Additionally, the remedial strategy included dewatering, sediment excavation and restoration of a four-acre wetland system.

Remedial Design

Project engineer for the design of a multi-remedial strategy; to include, steel containment wall, groundwater pump-and-treat, and phytoremediation in Wyandotte, Michigan. The remedial objective was to prevent the migration of dense non-aqueous phase liquid (DNAPL) into the Detroit River by installing a containment barrier and providing site hydrologic control. The project incorporated the preparation of design drawings and specifications, and the filing of pertinent federal, state, and local permits.

Fish Sampling Study

Project biologist for a fish sampling study conducted in a reservoir of the upper Hudson River. The project included the collection and analysis of targeted fish species via gill nets, angling, and electro-fishing as part of a long-term monitoring program.

Dual Phase Extraction (DPE) System

Project engineer for the design of a dual phase extraction (DPE) system for the treatment of contaminated soil and groundwater. The design incorporated AS/SVE system and groundwater pump-and-treat. Scope of involvement included assisting in the detailed design of the DPE remedial system, collection of field data, preparation of reports, air emission modeling, and the filing of pertinent federal, state, and local permits.

Groundwater Monitoring Project

Syracuse, New York

Project manager for a groundwater monitoring project. The project included the preparation of contract documents, subcontractor procurement, scheduling, analysis of sampling results, and preparation of reports.

Remediation System Optimization

Honeywell, Lebanon, New Hampshire

Project manager for optimization of a remediation system. The project included the review of design documents and O&M forms, system performance standards, and preparation of reports.

Remedial Action

Honeywell, New Jersey

Project engineer for the design and execution of a remedial action at a site impacted with PCBs and Ra226 underneath a warehouse concrete foundation. The project objective included the excavation and off-site disposal of soils impacted above New Jersey Department of Environmental Protection (NJDEP) soil clean-up criteria. Scope of involvement included development of remedial work plan, procurement, contractor scheduling, field engineering, PCB immunoassay field screening, and report preparation.

Pollution Prevention

Project engineer for the development of a Spill Prevention, Control, and Counter-measure (SPCC) Plan. The project objective was to provide an updated mechanism for minimizing the potential for adverse effects associated with the spill of petroleum or hazardous substances at Fort Drum's storage and handling facilities. Project included site assessments, data collection and evaluation, and preparation of reports.

Project engineer for the update of an SPCC, Installation Spill Contingency Plan (ISCP), and Pollution Prevention (P2) Plan for the New York Division of Military and Naval Affairs at the CSMS-C facility in Rochester, NY and Camp Smith facility in Peekskill, NY. The projects involved site assessments, data collection and evaluation, and preparation of reports.

Project engineer for the update of an SPCC, ISCP, P2 Plan, and Pollution Prevention Opportunity Assessment (P2OA) for the Fort Hamilton facility in Brooklyn, NY. The project involved a site assessment, data collection and evaluation, and preparation of reports.

In-Situ Phytoremediation

New York State Center for Hazardous Waste Management, Buffalo, New York
Designed and executed a feasibility study to assess the potential implementation of in situ phytoremediation to remove volatile organic compounds (VOCs) from impacted soil at a hazardous waste site in Arcade, New York.

Aquatic & Ecological Research

Great Lakes Center for Environmental Research and Education, Buffalo, New York
Conducted and assisted with a magnitude of aquatic / ecological research. Research involved surface water nutrient loading, water quality, fish bioenergetics, fish population dynamics, necropsy studies, sediment sampling, and ecological impacts of non-indigenous aquatic species.

Presentations

"Complex Pre-Design Investigation: How Effective Task and Data Management Can Lead to Increased Efficiency", Proceedings of the Fourth International Conference on Remediation of Contaminated Sediments, Savannah, Georgia, January 2007.

"A Feasibility Study To Assess The Potential Implementation Of In Situ Phytoremediation To Remove Volatile Organic Compounds from Impacted Soil", Thesis Defense at the State University of New York at Buffalo, New York, July 1998.

ARCADIS

Education
BS, Biology, State University College at Plattsburgh, Plattsburgh, NY, 1988

Years of Experience
Total - 21
With ARCADIS - 11

Dennis K. Capria

Principal Scientist

Mr. Capria has more than 20 years of analytical laboratory, data management and data validation experience in the environmental field. Currently, he is involved in the data management, data validation and QA/QC oversight of analytical data. Mr. Capria's responsibilities have ranged from overseeing the daily data management requirements for large industrial sites to the operation and maintenance of volatile and semivolatile organic (GC, GC/MS instruments). His analytical chemistry experience includes various sample preparations, wet chemistry techniques, data generation and interpretation. His supervisory experience includes managing a team of data validators as well as overseeing a QA/QC department at a laboratory.

Managerial/ Technical Expertise

In addition to serving as the leader of ARCADIS' Data Services Group, Mr. Capria has served as the quality assurance officer (QAO) for investigations of multiple hazardous waste sites. Sites include impacted aquatic systems, industrial facilities, landfills, and wastewater effluent discharges. As QAO, Mr. Capria serves as the primary communication link between analytical subcontractors and ARCADIS , and is responsible for managing coordinating field managers and analytical subcontractors, and the direction of the DSG personnel. Current responsibilities include developing quality assurance project plans (QAPPs) that are consistent with project data quality objectives (DQOs), and federal and state guidelines.

On a project-specific basis, he has been involved in developing analytical approaches to solve specific project requirements and regulatory needs; developing and reviewing bid documents for analytical services; and evaluating and auditing laboratory performance. Mr. Capia provides a wealth of data quality services for some of the largest industrial sites in theUnited States.

Data Quality Services

Mr. Capria is responsible for developing and reviewing project quality assurance documentation including project-specific (DQOs), (QAPPs), and field sampling plans (FSPs). He oversees the validation of mixed media (soil, sediment, water, biota, wipes, building material and air) data from investigations of multiple hazardous waste sites, including data validation pursuant to U.S. Environmental Protection Agency (USEPA) Functional Guidelines, and provides guidance on data usability. He manages and performs data validation efforts pursuant to USEPA regional and individual state guidelines, and is proficient in USEPA-CLP, USEPA-Regional, USEPA SW-846, 40 CFR Part 136, New Jersey Department of Environmental Protection (NJDEP), and New York State Department of Environmental Conservation (NYSDEC) ASP procedures.

Mr. Capria has been instrumental in the success of planning and implementing data management tools for the generation of hundreds of analytical presentation tables, which are utilized by ARCADIS and its clients in evaluating data for multiple projects.

Other Related Experience

Prior to joining ARCADIS , Mr. Capria held the positions of GC/MS chemist and analytical quality assurance/quality control coordinator at laboratories in the Northeast. His prior responsibilities included client contact for industrial and consulting firms regarding analytical services for a major ASP laboratory. He was responsible for the daily operation of the GC/MS department for an analytical laboratory. There, gaining extensive knowledge of USEPA acceptable methodologies, Mr. Capria worked to establish and implement the analytical guidelines for compliance with regulatory agency specifications. His responsibilities included:conducting sample analyses utilizing gas chromatography/ mass spectrometers;maintaining analytical instrumentation;scheduling analysis;reviewing and organizing data packages;writing standard operating procedures;training technicians; andstreamlining the electronic data collection between lab instrumentation and QA/QC department, accelerating client results.

Mr. Capria's other accomplishments included maintaining laboratory certifications (such as New York State Department of Health [NYSDOH], NYSDEC, NJDEP, and Pennsylvania Department of Environmental Resources [PADER]), preparing monthly control limits for QA/QC sample data, and providing a wealth of client services related to analytical program management.

Project Experience

QA/QC Coordinator and Data Validator

Confidential Client, Western Massachusetts

Served as the QA/QC coordinator and data validator for a major industrial site. At this massive site, was responsible for the day-to-day management of data for thousands of samples collected on a regular basis in support of various investigation and remediation programs. In this role, provided daily technical support to the client, managed the entire analytical program, supervised the data management for the project and performed data validation for the numerous samples per year. In addition, performed laboratory audits in support of the pre-design investigation (PDI) program for this industrial facility.

Data Management/Validation

Confidential Client, Schenectady, New York

Data management/validation in support of the RI at Nott Street Industrial Park, pursuant to USEPA Region 2 guidelines.

Data Management/Validation

Confidential Client, Western Massachusetts

Data management/validation in support of the off-site residential property investigations, pursuant to USEPA Region 1 guidelines.

Data Management/Validation

Confidential Client, Flint, Michigan

Data management/validation in support of the RFI at this automotive plant complex in accordance with USEPA National Functional and Region 3 guidelines.

Data Validation

Confidential Client, Flint, Michigan

Served as the validator for this large automotive site, where responsibilities included coordinating with client and project personnel, validating the data from the numerous samples collected each year, supervising and approving the input validation, and updating the database for the project. Also performed laboratory audits in support of the RFI completed at this site.

Data Management/Validation

CBS, Springfield, Massachusetts

Serves as the validator for the CBS site, where responsibilities included data management for the project, and performance of data validation for complete investigation.

Data Management/Validation

Confidential Client, Western Massachusetts

Data management/validation in support of the Consent Decree (CD) pre-design investigations and on-site National Pollutant Discharge Elimination System (NPDES) program at a large industrial facility, pursuant to USEPA Region 1 guidelines. Managed and validated more than 30,000 samples which have been collected at this facility over the past six years.

ARCADIS

Education
BS, Civil Engineering, Michigan Technology University, Houghton, MI, 2004

Years of Experience
Total - 5
With ARCADIS - 5

Professional Registrations
Engineer In Training, MI

Professional Associations
American Society of Civil Engineers

Adam Chwalibog, EIT

Project Engineer in Training

Mr. Chwalibog has more than 5 years experience as a geotechnical engineer in training specializing in performing broad based geotechnical engineering cost, investigation and design activities as part of large-scale environmental projects.

Project Experience

Kalamazoo River - Former Plainwell Impoundment
Confidential Client, Plainwell, Michigan
Administrative responsibilities included scoping and performing geotechnical pre-design investigation activities and assisting with geotechnical design components including an energy dissipation structure and landfill stability. On-site investigation activities included performing standard penetration testing, geotechnical and environmental soil sampling, monitoring well installation, specific capacity testing, classifying site lithology and coordinating laboratory testing. Investigation results were used to prepare summary reports for use as a basis for engineering design. Geotechnical design role included evaluating stability of embankment constructed from on-site disposed material. Tasks included evaluating the stability of embankment and foundation under final build-out conditions for global and bearing failures, evaluate anticipated settlement of foundation and determine procedures to be implemented during construction to maintain stability. Also evaluated the necessity for an energy dissipation system during removal activities based on anticipated flows.

Geotechnical Pre-Design Investigation Activities
National Grid, Rome, New York
Administrative project role included scoping and performing geotechnical pre-design investigation activities. Information used to design steel sheet pile barrier wall for use as part of an environmental remediation design at the former Kingsley Avenue MGP site. Design included determining soil conditions for constructability and permeability, determining soil parameters from laboratory analyses and defining constituents involved to determine wall type. Assisted in preparation of specifications, construction drawings, and engineering design reports, and provided technical support during construction.

Geotechnical Stability and Settlement Analysis
Confidential Client, Model City, New York
Administrative responsibilities included preparation of geotechnical engineering appendices for engineering design reports for the RMU-1 landfill. Evaluated the stability of landfill slopes under

final build out conditions for global, veneer, and sliding block failure under both static and seismic loads using slope stability programs Slope/W and XSTABL. Calculated anticipated primary and secondary settlement of base liner systems under final build out conditions to verify design requirements in accordance with the New York State Department of Environmental Conservation (NYSDEC) Regulations SubPart 360 for site inNew York.

Remediation of Creek and River Sediments

Confidential Client, River System, Midwest US

Administrative project role included scoping and performing geotechnical pre-design investigation activities and designing excavation support systems for environmental removal operations. Design included cantilevered and braced sheet pile walls as well as soldier pile and lagging walls using the design software Shoring Suite and Prosheet and included determining soil types, interpreting soil parameters, defining earth pressures and surcharge loads to adequately model site conditions. Provided technical support for geotechnical design components during construction.

Geotechnical Pre-Design Investigation andNAPL Barrier Wall Design

New York State Electric & Gas (NYSEG), Binghamton, New York

At the former Court Street manufactured gas plant (MGP) site, responsibilities include defining geotechnical needs, preparing cost estimates, and contracting out drilling and laboratory services for on-site investigation activities. Assisted with the geotechnical design of NAPL collection trench including evaluating trench materials for clogging potential and providing soil filter criteria. Also provided on-site geotechnical support during jet grouting and trenching activities.

316(b) Cost Evaluation

Consumers Energy, Saginaw/Port Sheldon, Michigan

Investigated multiple design options for client consideration, evaluated components included in construction and determined comprehensive construction costs associated with updating generating stations to meet standards set by the U.S. Environmental Protection Agency (USEPA) 316(b) regulation.

Geotechnical Pre-Design Investigation Activities

New York State Electric & Gas (NYSEG), Oneonta, New York

At this former MGP site, responsibilities included defining geotechnical needs, preparing cost estimates and contracting out drilling and laboratory services. On-site investigation activities included performing standard penetration testing, geotechnical and environmental soil sampling, classifying site lithology and coordinating laboratory testing. Investigation results were used to prepare summary reports for use as a basis for engineering design.

Geotechnical Pre-Design Investigation Activities

National Grid, Amsterdam, New York

Project role included scoping and performing geotechnical pre-design investigation activities. Information used to design steel sheet pile barrier wall for use as part of an environmental remediation design at the former Front Street MGP site. Design included determining soil conditions for constructability and permeability, determining soil parameters from laboratory analyses and defining constituents involved to determine wall type. Assisted in preparation of specifications, construction drawings, and engineering design reports, and provided technical support during construction.

Geotechnical Pre-Design Investigation Activities

Confidential Client, Chelsea, Massachusetts

Responsibilities included performing on-site investigation activities such as standard penetration testing and rock coring, collecting geotechnical soil samples, classifying site lithology and coordinating laboratory testing. Investigation results were used to prepare summary reports for use as a basis for engineering design.

Excavation Support Design

National Grid, Hudson, New York

Project role for Operable Unit 1 (Water Street) MGP site included designing excavation support system for environmental removal operations. Design included braced sheet pile walls using the design software Shoring Suite and Prosheet, and included determining soil types, interpreting soil parameters, defining earth pressures and surcharge loads to adequately model site conditions.

Geotechnical Stability and Settlement Analyses

Confidential Client, Monroe County, New York

At a municipal waste landfill, prepared geotechnical engineering appendices for engineering design reports. Design included evaluating the stability of landfill slopes under final build out conditions for global, veneer and sliding block failure under both static and seismic loads using slope stability programs SlopeW and XSTABL. Calculated anticipated primary and secondary settlement of base liner systems under final build out conditions to verify design requirements in accordance with the New York State Department of Environmental Conservation (NYSDEC) Regulations SubPart 360 for site in New York.

Geotechnical Stability and Settlement Analyses

Confidential Client, Western Massachusetts

Prepared geotechnical engineering appendices for engineering design report for the waste disposal facility. Evaluated the stability of landfill slopes under final build out conditions for global, veneer and sliding block failure under both static and seismic loads using slope stability program SlopeW. Calculated anticipated primary and secondary settlement of base liner systems under embankment loading to verify design requirements.

Geotechnical Pre-Design Investigation Activities and Stability Analysis

Confidential Client, Northeastern United States

Responsibilities included performing geotechnical pre-design investigation activities and assisting with geotechnical design components on this major waterway. On-site investigation activities included performing standard penetration testing, cone penetrometer testing, vane shear, and rock coring, classifying site lithology and coordinating laboratory testing. Investigation results were used to prepare summary reports for use as a basis for engineering design. Design role included performing slope stability evaluation of proposed unloading/staging area under anticipated geometry and loading conditions.

ARCADIS

Education
BS, Forest Engineering, SUNY College of Environmental Science and Forestry, Syracuse, 2002

Years of Experience
Total - 7
With ARCADIS - 7

Professional Registrations
Engineer In Training, NY, since 2002

Professional Associations
American Society of Civil Engineers

Cristina A. Albunio

Project Manager

Ms. Albunio is a civil engineer with 7 years of experience in the areas of site design, stormwater management, channel hydraulics, solid waste management, and geosynthetics design.

Project Experience

Stormwater Management Activities
Ongoing operations and engineering support for stormwater management activities at an active hazardous waste landfill. This includes evaluation of watersheds and corresponding capacities of basins, ditches, and culverts. Also, providing grading recommendations and control points as filling of active cells progresses. The overall objective of the operations support was to help the client maintain compliance with the various conditions in their New York Codes, Rules, and Regulations (NYCRR) Part 373 permit for the landfill.

Site Design and Stormwater Management Plans
Site design activities related to the relocation of a 1,500 foot segment of a stream submitted to and approved by the US Environmental Protection Agency and Illinois Environmental Protection Agency. The design included the layout of a new channel location and configuration by establishing the horizontal and vertical alignment of the relocated creek channel using three-dimensional terrain modeling software. The design was then used to determine the resulting cut and fill volumes for each type of cut and fill material based on the final grading design. Also, evaluated the net change in floodwater storage volume.

The design also included various stormwater management features included ditches, swales, berms, and culverts. Developed the stormwater management plan for the 50-acre site that included the relocation of the existing creek and effectively routing all runoff around areas of remediation. This included stability and capacity evaluations of grass- and riprap-lined open channels, culvert capacity calculations, and outfall design. Additionally, assisted in the evaluation of the stability of the relocated creek's lining.

Also, designed a stormwater management plan for a low-permeability engineered surface cover over 22 acres of an inactive industrial facility. This required a series of ditches, culverts, and diversion berms to manage the stormwater runoff from the surface cover. Designed subgrade and final cover grades for multiple kinds of engineered barrier types and thicknesses across the site that included access roads and accommodated in-place facility structures.

Engineering Design Pertaining to Part 373 Permit Documentation

Performed a number of activities related to the engineering design included in the engineering report submitted to the New York State Department of Environmental Conservations (NYSDEC) as part of a Part NYCRR 373 permit modification application to site, construct, and operate a 50 acre double lined hazardous waste landfill in New York. Specifically these activities included: completing a storage volume analysis and estimated site life for the landfill; determining the required physical properties for geotextiles; determining the minimum required transmissivities for the geocomposite of the liner system; determining the requirements of the leachate collection pipe and sideslope riser pipe; evaluating the hydraulic conditions associated with the leachate collection, transfer, and storage system of the landfill; demonstrating that the proposed geometries of surface water diversion berms, mid-slope swales, and perimeter ditches provided adequate hydraulic capacity and stability; demonstrating that the proposed gabion lined final cover drainage downflume geometry provides adequate hydraulic capacity and stability; determining required culvert configurations; designing the required inlet grate configuration, pipe diameters, and hydraulic conditions within a proposed subsurface storm sewer system; and preparing various engineering drawings included in the engineering report related to stormwater management features, leachate management details, watershed delineation limits, grading plans, and various landfill construction details.

Also prepared two modifications to a Part 373 Permit for an active New York hazardous waste landfill. The first permit modifications included a redesigned landfill final cover. This included an increase in landfill elevation and substitution of geosynthetic clay liner (GCL) in the final cover in lieu of compacted clay. The second permit modification included the redesign of a perimeter channel exhibiting erosion problems.

Engineering Design Pertaining to Part 360 Permit Documentation

Performed a number of activities related to the engineering design included in the Part 360 permit application for a 147 acre lateral expansion and a vertical expansion of an existing 149 acre USEPA Subtitle D certified, double composite landfill in New York State. The engineering designs were performed in accordance with NYCRR Part 360 administered by the NYSDEC. Specifically these activities included: determination of the horizontal and vertical limits of the landfill expansion. subgrade grading design using three-dimensional terrain modeling software to design seven separate landfill cells; liner and leachate collection system design; leachate management system design; final cover system grading design; stormwater basin design; evaluation of the adequacy of the proposed leachate conveyance system; determination of the peak daily leachate generation rate; determination of the configuration for the leachate collection pipes of the primary and secondary leachate collection systems; determination of the location and sizing of stormwater management features for the final cover system including mid-slope swales, downchutes, perimeter ditches, site access road ditches, and culverts; preparation of material specifications for each component of the liner and final cover system; determination of the

estimated increase in airspace and site life due to the landfill expansion; preparation of engineering design drawings that included subgrade and final cover grading plans; cross sections; and berm, liner system, leachate collection and conveyance, final cover system, erosion control, and stormwater management details and the design and evaluation of multiple operational grading plans.

Sitewide Drainage Evaluation

Performed a sitewide drainage evaluation of a 260-acre site and 50-acre site that included a curve number assessment, watershed delineation, and basin capacity calculations.

Three-Dimensional Models Creation

Create three-dimensional models of existing and proposed surfaces for a number of projects including landfills, brownfields, lagoons, excavations, filled areas, streams, and consolidation areas utilizing Terramodel computer software. Each project targeted specific excavation or fill volumes, a net cut/fill balance, and/or stormwater management concerns.

Geosynthetics Design and Installation

Calculated the required transmissivity for geocomposites in final covers and liner systems of landfills and engineered barrier surface covers. Designed collection pipes in order to collect water or leachate from the geocomposite. Prepared construction details related to these water management features to accommodate field conditions. Designed a final cover perimeter drain system and the tie-in of the final cover geosynthetics to a sheetpile wall along the perimeter of a landfill. Developed technical specifications and construction details for manufacturing and installation requirements for HDPE geomembrane, PVC geomembrane, geocomposite, soil reinforced geogrid and geotextiles. Conducted field oversight of HDPE installation and geocomposite.

Determine Expected Rate of Leakage through an HDPE Lagoon Liner

Assisted in determining the expected rate of leakage through an HDPE lagoon liner in order to design an effective underdrain system.

Grading and Stormwater Management Plan

Designed the grading and stormwater management plan for a brownfield redevelopment site at a 20-acre inactive landfill. This involved the design of a subsurface drainage network with manholes, catch basins, and several culverts. Additionally, the design of grass-lined ditches and riprap discharge points were designed. This included the use of erosion control blankets in order to ensure stable post-grading conditions.

Post-Remedial Stormwater Management Plan

Prepared the post-remedial stormwater management plan for an area undergoing soil excavation. This included the design of a grading plan that provided drainage to collection points. These collection points where dependent on property boundaries, desired discharge locations, and the

design of geosynthetic barriers that were installed above the remediated areas. Geosynthetic barriers were asphalt-, vegetated-, and gravel-covered caps requiring a design that effectively collected runoff from all varieties. Designed collection pipes, ditches, and discharge points. Also, provided detailed design work on technical drawings and created technical specifications for all aspects of geosynthetic barriers and stormwater management materials.

Operation and Maintenance Evaluation of Stormwater Management Features
Evaluated the existing conditions of a constructed stormwater management features and their adequacy in providing management during site operation and maintenance activities at a closed 22 acre landfill at a superfund site located in Michigan. Provided recommendations for maintenance that were presented to the Michigan Department of Environmental Quality (MDEQ). Following the performance of maintenance activities, I developed and prepared formal calculations to determine if the sedimentation basin provided adequate storage capacity to contain stromwater runoff.